

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the affected environment for each resource, followed by environmental consequences for each of the alternatives evaluated in detail. The affected environment discussion describes the social and economic, biological and physical conditions of the analysis area. The intent is to characterize the current condition of each resource. The environmental consequences then address the direct, indirect, and cumulative impacts on the environment by each alternative. This chapter provides the scientific and analytic basis for the comparison of alternatives presented in Chapter 2.

The level of detail in this chapter includes information necessary to support and clarify the impact analysis and understand the effects of the alternatives. Descriptions of the existing environments and environmental effects by alternative were developed from reports prepared by resource specialists from the Forest Service (FS) and Bureau of Land Management (BLM). Additional information can be found in the OHV project file.

ENVIRONMENTAL SETTING OF THE ANALYSIS AREA

The analysis area includes BLM and FS Northern Region administered lands in Montana, North Dakota and portions of South Dakota. The environmental setting of the analysis area can be described in three ecological regions: Rocky Mountain Region, Great Plains Region, and North American Prairie Region (Bailey 1995) (Figure 3.1).

The Rocky Mountain Region covers the mountainous area of western and portions of central Montana and is generally characterized by steep, rugged mountains separated by flat valley bottoms. These mountains consist of highly folded, faulted, intruded and uplifted sedimentary strata. The rocks that form these mountains are tens of millions to billions of years old. Formation of the Rocky Mountains began around 60 million years ago as the Mesozoic Era ended. By the early Eocene, 20 million years later, the crustal disturbances forming the mountains relaxed and mountain building ended.

Currently, the mountains are covered by conifer forests with grassland foothills. The forest types vary considerably, ranging from dry ponderosa pine to moist western red cedar to cool spruce/fir types. Lodgepole pine and Douglas-fir dominated forests are common in this region. Elevation in this region ranges from 2,000 feet to greater than 11,000 feet. Geologically, this area is diverse with bedrock that is igneous or sedimentary in origin. Soils have developed in place or have resulted from volcanic ash eruptions such as from Mount Mazama. Climatically, the area has relatively cold winters with substantial amounts of precipitation coming in the form of snow with some rain in the spring and fall. Summers are typically dry. Annual precipitation ranges from 15 to 25 inches in the valleys and up to 100 inches in the mountains.

In marked contrast, the **Great Plains Region** is characterized by relatively gentle topography, rolling plains and tablelands with an important exception of areas referred to as “badlands.” The relatively low relief indicates flatlying bedrock. Horizontally bedded, undeformed, sedimentary strata underlie this region. Although the age of the underlying strata is comparable to that of the Rocky Mountain Region, only the youngest strata are visible at the surface. This region covers most of North Dakota, South Dakota, eastern Montana, and portions of central Montana.

The climate is semiarid with cold, dry winters and warm to hot and dry summers. Overall, annual precipitation ranges from 10 to 20 inches. The vegetation is short and mixed grass prairie, comprised of various species of grasses, forbs, cacti, sagebrush and rabbitbrush and a scattering of scrub trees in some areas. There is often bare soil between the plants.

The North American Prairie Region covers the very eastern edges of North Dakota and South Dakota. It has little topographical relief and ranges from 1,000 to 2,000 feet in elevation. Flat and rolling plains from glacial drifts and outwash plains characterize this region. The annual precipitation is 20 to 40 inches, with most of it coming during the growing season, thus drought is uncommon. Grasses dominate the vegetation, although deciduous forests will invade where grazing and fire have been excluded.

FIGURE 3.1
Ecological Regions



VISUALS AND RECREATION

AFFECTED ENVIRONMENT

Landscape Character

The three-state area includes three regional landscape character types: Rocky Mountains, Great Plains, and North American Prairie. General landscape characteristics of each region have been described earlier in this chapter. Boundaries between adjoining regions are often an expression of transition from one set of visual characteristics to another rather than a distinctive change. These broad character types are descriptive of the entire landscape regardless of ownership.

Rocky Mountain Region: Visually, in this region there is a strong interplay of texture and color created by the mosaic of trees, shrubs, grasses, stringers of meadows along stream courses within the forests, and stringers of trees or shrubs in the grasslands. The degree to which people have modified the natural landscape on public lands varies from undeveloped wildlands to those heavily influenced by logging and mining. Broad valleys are usually in private ownership with farming and ranching creating a pastoral appearance. The overall image of the Rocky Mountain Region is variety in the landscape.

BLM and National Forest System (NFS) lands in the Rocky Mountain Region have an extensive network of roads and trails. Many were designed and constructed by the FS and BLM, but some were also created by users (ranchers, miners, hunters, loggers, and others) over the past one hundred years. Because of forest vegetation and topography, most of the user-created roads and trails are most evident in the foreground viewing areas.

Great Plains Region: Commonly, landscapes in the Great Plains Region provide the viewer with a sense of little or no boundary restriction. Visually contrasting with the natural setting, cultivated grain and fallow fields and narrow irrigated strips in incised valleys are additional pastoral features found on private lands in this region. This type of landscape does not lend itself well for visually absorbing human modifications, such as roads that contrast with the natural appearing landscape. Eastern Montana, North Dakota and South Dakota BLM and NFS lands have an extensive road network consisting of designed and constructed routes and two-track roads or prairie trails. Some of the two-track roads and trails have been around for more than a hundred years, while others are more recent. Many were created by motorized wheeled cross-country travel and few, if any, were designed to blend with the landscape. Some routes travel up steep slopes or follow ridgelines,

adding unnatural lines and highly contrasting colors to the landscape. The agencies do not have adequate data to determine the miles of new roads created each year or the miles of roads known as prairie trails.

North American Prairie Region: Extending from Texas to Alberta, the North American Prairie Region covers the mid and eastern portions of North Dakota and South Dakota. Much of the private land in this landscape has been cultivated for agriculture. Public lands are generally not cultivated, though many acres are grazed by cattle. This region contains the Shейenne National Grassland (now part of the Dakota Prairie Grasslands). There are no BLM lands in this region.

Visual Quality

Current FS forest plans use the Visual Management System for assessing visual effects. Visual Quality Objectives (VQO's) are a measure of how natural a landscape appears, or would appear, under various management scenarios (USDA 1973 and 1974). Human alterations can sometimes raise or maintain visual quality within the landscape character, but more often it is lowered, depending on the deviation from the natural appearing features of the character. The existing visual condition of national forests and grasslands presently varies from unaltered to heavily altered and meets VQO's of Preservation to Maximum Modification, depending on past development and use, and on the degree and type of management direction for Management Areas identified in the various forest plans. In forested areas, roads, timber harvest, mining, and winter sports sites have the most influence on visual quality. In grasslands, roads, recreation developments, fences, mining development and facilities, electronic sites and trails have the most influence on visual quality. Many of these same influences apply to lands above the timberline.

The BLM uses a slightly different system for classifying and managing scenery. BLM management objectives vary from Class I, preservation of the characteristic landscape, to Class IV, which allows for major modification of the landscape (BLM Manual Handbook 8410-1 1986). All four classes are found on public lands in the analysis area. Some of the most visually sensitive of these lands are within view of major travel corridors, such as highways and county roads. Depending upon location, user-created roads and trails sometimes do not meet management objectives due to the difficulty of the Great Plains landscape in absorbing human impacts.

Recreation

Outdoor recreation, which includes motorized use, is one of the purposes for which public lands managed by the FS and

the BLM are administered. Motorized recreation, where appropriate, is a legitimate activity on public lands. Executive Order (EO) 11644 (1972) Use of Off-Road Vehicles on Public Lands, as amended by EO 11989 (1977) Off-Road Vehicles on the Public Lands, gives direction on providing motorized opportunities while protecting resources, promoting safety, and minimizing conflicts with other users. At the time the Executive Orders were issued, motorized wheeled cross-country travel was not as prevalent as it is today, and many public lands were left open and unrestricted. Presently there are 5.8 million acres open seasonally or yearlong to motorized wheeled cross-country travel on BLM lands and 10.1 million acres open on NFS lands within the analysis area. With the surge in motorized use over the past decade, the effects of motorized wheeled cross-country travel are more apparent and causing concern expressed by many public land users.

Contributing to the boom in off-highway vehicle (OHV) use since the completion of forest plans and resource management plans are the advancements in OHV technology and the rise in popularity of all-terrain vehicles (ATV's). In the past 10 years the popularity of OHV's continues to increase, and with it the associated conflicts. Contributing to the problem are the large areas of public lands that are still classified as open (no restrictions for motorized wheeled cross-country use) or that only have seasonal restrictions.

Recreation conflicts occur when participation in one recreation activity reduces the recreation experience of another user. Recreation conflicts resulting from motorized wheeled cross-country travel take several forms. Conflicts are usually between the motorized and nonmotorized recreationists. In areas that are open to motorized wheeled cross-country travel during the hunting season, the conflict is between motorized hunters who travel cross-country to scout for game, access favorite hunting areas, drive or chase game for a better shot and to retrieve game, and nonmotorized hunters whose method of accessing, scouting, stalking, and retrieving are by foot or horse. Part of the conflict is the noise created by motorized vehicles that may disturb game animals and displace them from the immediate area. Motorized wheeled cross-country travel on public lands can also push big game animals onto adjacent private lands that are posted and off limits to the general public.

Most nonmotorized recreationists are usually seeking quiet-type recreation experiences and feel the noise, exhaust fumes, and wheel tracks left behind from motorized wheeled cross-country travel conflict with and reduce the quiet, more primitive recreation experience they are seeking.

Many motorized recreationists who stay on roads and trails feel that those who travel cross-country on motorized vehicles are not practicing good land ethics (Tread Lightly!

principles, Appendix E) and give the entire group of motorized recreationists a bad name.

Settings

NFS lands are mostly large blocks of public lands with reasonable public access. Private lands and other state and federal ownerships are often intermingled within these blocks of public land. BLM lands, on the other hand, are very often widely scattered tracts separated by great distances. Some larger blocks of BLM lands do occur. Motorized access to BLM lands is often limited by surrounding private lands, rather than by a lack of roads or trails. Some recreationists drive cross-country to avoid private land if there are no fences and the terrain permits. The BLM estimates that most motorized use in eastern Montana, North Dakota and South Dakota occurs on roads and trails, rather than cross-country. Based on field observations, new two-track roads are formed as more private lands adjacent to BLM lands are closed to the public.

NFS and BLM lands provide very diverse recreation settings. Differences in landform, climate, and elevation create physical settings that include open rolling grasslands, badlands, plateaus and tablelands, grass/shrublands, open timber/grass foothills, floodplains and riparian areas, wetlands, luxuriant dense forests, craggy mountains, narrow to broad valleys, glaciated cirque basins, and high mountain lakes. Settings vary from urbanized environments to large, unmodified areas.

Social settings reflect the amount and frequency of contact between individuals and groups. Social settings on public lands are varied; recreationists may find solitude in areas where there are few other people or where they may encounter large numbers of people in heavily used or concentrated use areas. Encounters with others vary depending on the season of use, the attractiveness of the area, the proximity to population centers, and the particular recreation activity.

Road and trail densities on public lands that are open seasonally or yearlong to motorized wheeled cross-country travel vary. For example, the Whitetail-Pipestone area, a popular area for riding OHV's on BLM and NFS lands near Butte, Montana, contains 800 miles of roads and trails over a 275,000-acre area. A study being conducted on this area shows a road and trail density that varies from less than .5 miles per square mile in undeveloped areas to over 4 miles per square mile in the more heavily accessed areas (USDA 1999c). This is representative of road and trail densities on affected public lands in southwestern and central Montana. In northwestern Montana where areas have been heavily accessed for timber harvest, road densities are often greater, but some of these roads are not available for motorized

travel. On BLM lands in the three-state area, recreationists are usually not more than a mile or two from a road or trail. However, this does not necessarily mean the public has legal access to these roads and trails because some originate from or cross adjacent private lands.

The actual number of roads and trails on NFS and BLM lands is unknown, but records and observations indicate there are thousands of miles of roads and trails on the affected lands. Almost all site-specific recreation attractions (e.g., dispersed camping spots and historic mining areas) have roads or trails leading to them.

Off-road motorized travel is not allowed in any BLM Wilderness Study Area. While motorized wheeled cross-country travel is not allowed within most national forest and grassland Forest Plan Recommended Wilderness Areas and Montana Wilderness Study Areas, there are portions of these areas where motorized wheeled cross-country travel is presently allowed. These are covered in more detail in the Inventoried Roadless, Forest Plan Recommended Wilderness, and Wilderness Study section of this chapter.

Recreation settings contain a managerial component, such as regulations and restrictions that influence how and when public lands are accessed, used, and what type of activities take place. Regulations and restrictions vary across public lands. Regulations require that all FS and BLM areas and trails must be classed as prohibited/closed, restricted/limited, or allowed/open to off-road motorized vehicle use (36CFR 295 and 43CFR 8342).

Settings are influenced by restrictions that are placed on the land. OHV restrictions fall under several categories. On NFS and BLM lands there are open areas that include areas open yearlong to motorized use with no restrictions and BLM intensive use areas. There are six BLM intensive use areas in Montana (4,210 acres): South Hills area near Billings, Glendive OHV area near Glendive, Terry OHV area near Terry, Glasgow OHV area near Glasgow, Fresno OHV area near Havre, and Radersburg OHV area near Radersburg. The BLM intensive use areas have already gone through an analysis that determined motorized wheeled cross-country travel is an appropriate use. They have been designated for intensive motorized recreation use and are not part of the alternatives in this final Environmental Impact Statement and proposed plan amendment (FEIS). In addition, there are some isolated BLM lands (5,500 acres) that would remain open. These isolated lands were addressed in the Elkhorn Mountains Travel Management Plan (1995) and are not part of the affected environment. Also, the drawdown area (3,630 acres) around Lake Koocanusa on the Rexford District of the Kootenai National Forest would not be affected by any of the alternatives. The drawdown area is currently being addressed in the Rexford

District Recreation Management Plan. The other areas that are open yearlong are included in the alternatives for this FEIS (11.2 million acres). Areas that are limited (BLM) or restricted (FS) include areas that have seasonal closures to motorized wheeled cross-country travel (4.7 million acres) and areas that are closed yearlong but have open roads and trails within them (5.6 million acres). The latter is often referred to as an area closure with designated routes and is not part of the affected environment. The areas with seasonal restrictions are included in the alternatives for this FEIS (4.7 million acres). Finally, there are closed areas that are entirely closed to motorized wheeled cross-country travel yearlong (5 million acres). These areas are also not part of any alternatives in this FEIS. See Table 3.1 for more details.

Over much of Montana, enforcement of travel regulations on BLM and NFS lands is done in a cooperative fashion between the BLM, FS, and Montana Fish, Wildlife and Parks Wardens. The State of Montana has incorporated federal travel restrictions into state law, which allows the Wardens to enforce travel restrictions on NFS and BLM lands. There are no similar agreements in North Dakota and South Dakota.

Off-Highway Vehicle Activities

Recreation activities include pursuits such as hunting, fishing, trapping, camping, picnicking, rock hounding, gathering products such as firewood and plants, viewing scenery and wildlife, hiking, cross-country skiing, nature study, and riding ATV's, motorcycles, and other full size trucks and vehicles for pleasure. Participation in recreation activities varies by season, topography, vegetative cover, and number of people taking part.

Several Montana studies have been conducted that give indications of motorized recreation activity participation. In 1993 and 1994, the Institute for Tourism and Recreation Research conducted a study of Montana that examined the rates of participation in eleven recreation activities (McCool and Harris 1994). In the six months preceding their survey, the study estimated that adult Montanans in the study participated in the following off-highway motorized recreation activities at the following rates: 9.1% motorcycle, 11.8% ATV, and 19.6% four-wheel drive road vehicle. In 1997, Montana Fish, Wildlife and Parks conducted a random telephone survey of Montanans that included participation in recreation activities (Montana Fish, Wildlife and Parks 1997). The survey respondents reported using trails within the two years preceding the survey for off-road recreation activities at the following rates: 2% motorcycle, 2% ATV, and 2% four-wheel drive road vehicle. While these studies do show different results, they are an indication that motorized recreation use by Montanans may be as

Table 3.1 OHV Designations Table - Acres by BLM Field Office and National Forest/Grassland

<i>BLM Field Office</i>	<i>Open Seasonally</i>	<i>Open Yearlong</i>	<i>Designated Intensive Use</i>	<i>Limited Yearlong</i>	<i>Closed Yearlong</i>	<i>Total</i>
Miles City	631	1,069,114	2,320	1,626,989	80	2,699,134
Billings	80,000	236,796	1,270	101,480	6,940	426,486
Malta	328,720	1,665,610	40	110,206	0	2,104,576
Lewistown	375,874	778,516	80	214,294	23,620	1,392,384
Missoula	0	0	0	162,400	572	162,972
Butte	0	187,200	500	115,600	8,000	311,300
Dillon	79,560	712,460	0	117,314	58,774	968,108
South Dakota	0	273,972	0	0	6,700	280,672
North Dakota	22,164	35,603	0	0	1,990	59,757
Total	886,949	4,959,271	4,210	2,448,283	106,676	8,405,389
<i>National Forest/ Grassland</i>	<i>Open Seasonally</i>	<i>Open Yearlong</i>	<i>Designated Intensive Use</i>	<i>Restricted Yearlong</i>	<i>Closed Yearlong</i>	<i>Total</i>
Beaverhead-Deerlodge	602,269	1,318,883	0	792,113	639,007	3,352,272
Bitterroot*	102,298	693,566	0	38,380	282,838	1,117,082
Custer	267,593	490,489	0	45,324	383,737	1,187,143
Dakota Prairie	0	1,259,947	0	0	0	1,259,947
Flathead	53,026	1,157,862	0	147,593	994,568	2,353,049
Gallatin	5,773	773,856	0	9,927	1,011,070	1,800,626
Helena	78,341	493,108	0	198,301	205,663	975,413
Kootenai*	1,404,053	146,534	0	127,066	542,526	2,220,179
Lewis & Clark	1,334,107	12,621	0	129,213	386,348	1,862,289
Lolo	0	0	0	1,711,331	371,000	2,082,331
Total	3,847,460	6,346,866	0	3,199,248	4,816,757	18,210,331
	<i>Open Seasonally</i>	<i>Open Yearlong</i>	<i>Designated Intensive Use</i>	<i>Limited/Restricted Yearlong</i>	<i>Closed Yearlong</i>	<i>Total</i>
Total BLM & National Forests/Grasslands	4,734,409	11,306,137	4,210	5,647,531	4,923,433	26,615,720

* Only includes lands in Montana.



OHV's are used for a number of recreation activities. Photo courtesy of Montana Trail Vehicle Riders Association.

low as 6% or as high as 20% of total recreation activity participation.

The words off-road and off-highway are often used synonymously and usually mean any riding that is not on pavement or on a high-standard gravel road. Riding the primitive roads and trails on public lands is often referred to as "off-road." It is unknown exactly how many people drive motorized vehicles cross-country. This does not refer to those people who just pull off adjacent to an existing road or trail to park or let someone pass, but who actually travel cross-country. Estimates vary up to 10%, depending on location, that people engaged in motorized activities travel cross-country. Recreation specialists and law enforcement personnel (B. Duncan et al., pers. comm. 1999) estimate when one looks at the three-state area from the open grasslands in the east to the heavily forested areas of the west and take into account the variations in seasonal use, cross-country travel by motorized vehicles probably averages 1% or less of the total. This is a small percentage of the total recreation OHV use, but motorized wheeled cross-country travel does cause problems as identified in this EIS.

The type of activities and the amount of recreation use varies greatly from east to west. People travel cross-country

for many reasons. Most motorized wheeled cross-country use in eastern Montana, North Dakota and South Dakota occurs during the fall hunting season. Some recreationists drive cross-country in conjunction with other activities such as hunting, while for others motorized wheeled cross-country travel is the experience they are seeking. Some people just like to explore using their motorized vehicle. Some prefer more leisurely, less challenging activities, while others prefer the challenge of a steep hillside. Public lands provide many opportunities for OHV use that vary from backcountry to concentrated use areas such as the BLM South Hills OHV area near Billings. While there are intensive use areas on BLM lands with no restrictions on where one can drive, there are no designated OHV areas offering motorized recreationists the opportunity to ride designated roads and/or trails that form a loop system with a variety of opportunity and length (much like the winter snowmobile trail systems).

In the eastern portion of the analysis area, impacts from intensive motorized wheeled cross-country use are minimal, which suggests a low frequency of motorized wheeled cross-country travel occurring in the eastern portion of the analysis area. However, there are a few areas where one can see the evidence of impacts from motorized wheeled cross-country travel. One example is Strawberry Hill near Miles City, a locally popular area used by both motorized and nonmotorized users.

In western Montana, OHV cross-country use is spread over the spring-summer-fall seasons and, in some cases, occurs yearlong at lower elevations where snow is sparse. Many areas are restricted to motorized wheeled cross-country use during the fall hunting season to provide for game security and/or provide a nonmotorized hunting experience. Areas open to motorized wheeled cross-country travel and where terrain and vegetation permit, generally receive additional motorized use during the fall hunting season. There are also a greater number of people out on public lands in western Montana than in eastern Montana, North Dakota and South Dakota because of close proximity to larger population centers.

People with disabilities travel cross-country at times to pursue their recreation activity. Currently, disabled access programs on public lands are focused on the hunting season, but there is increased interest to provide special access for other recreation activities and at other seasons of the year. The hunting season programs usually only allow the disabled person to hunt with a motorized vehicle from roads and trails that are closed to others. In Montana, most disabled access hunter programs are only offered to those who are issued a permit by the State to shoot from a motor vehicle. Section 504 of the Rehabilitation Act of 1973, as amended, addresses exclusion, denied benefits, or dis-

crimination of a qualified individual with a disability from programs or activities conducted by a federal agency.

Recreation Opportunity and Use

The FS and BLM use slightly different methods for calculating recreation use. Each FS Recreation Visitor Day (RVD) is equal to 12 hours. This could be 1 person for 12 hours or 12 people for 1 hour, or any combination thereof participating in that recreation activity. BLM uses the term “visits” to measure use. A BLM visit is not measured in days, but is a person who visits BLM lands engaged in any recreation activity whether for a few minutes, a full day or more. While these methods of tracking recreation use are different, they do give a relative relationship of use between the Rocky Mountain, Great Plains, and North American Prairie Regions.

Rocky Mountain Region: This consists of the Beartooth District of the Custer National Forest, the Gallatin, Beaverhead-Deerlodge, Helena, Lewis and Clark, Lolo, Flathead, and Kootenai National Forests and the lands managed by the BLM Field Offices at Butte, Dillon, Missoula and Lewistown.

NFS and BLM lands in this region contain many thousands of miles of fishing streams, hundreds of lakes, thousands of miles of constructed roads and trails, hundreds of developed recreation sites, and millions of acres of developed and undeveloped lands. NFS and BLM lands cover 17.8 million acres. Vegetation varies from dry foothill grasslands to dense moist forests. Topography varies from gentle and rolling to steep. Motorized wheeled cross-country travel occurs mostly on the flatter, more open country.

The region, situated between Yellowstone and Glacier National Parks, bisected by Interstates 90 and 15, and containing the population centers of Butte, Helena, Bozeman, Missoula, Livingston, Dillon, Hamilton, Kalispell, and Libby, attracts local recreationists and is a destination for many out-of-state visitors. Many cities have local OHV groups or associations. Just about every type of outdoor recreation takes place on these public lands. Because of the close proximity to larger population centers and good public road access, this region receives the most visitor use in the three-state area. The majority of motorized use occurs in this region. NFS lands cover 16.3 million acres in this area with approximately 8.3 million acres open seasonally or yearlong to motorized wheeled cross-country travel. Total visitor use for all activities on NFS lands was approximately 13 million RVD's for 1996. BLM lands cover 1.5 million acres in this area with approximately 1 million acres open seasonally or yearlong to motorized wheeled cross-country travel. Total recreation visitor use on these BLM lands was approximately 2 million visits in 1995.

Great Plains Region: This region contains the Grand River, Cedar River, and Little Missouri National Grasslands (all now part of the Dakota Prairie Grasslands), the portion of the Custer National Forest located in central and eastern Montana and in western South Dakota, and lands managed by the BLM Field Offices in North Dakota, South Dakota, Miles City, Malta, Lewistown, and Billings.

NFS and BLM lands in this region contain fishing streams, rivers, lakes and ponds, many constructed roads, and some constructed trails. In addition to designated roads and trails, nondesignated roads and trails are formed by visitors traveling cross-country. These roads and trails may be many years old and are not maintained. These routes often provide more challenging experiences, especially for horseback riders, hikers, and mountain bike enthusiasts. Public land in this region is popular with both in-state and out-of-state hunters seeking antelope, deer, and upland birds.

The Grand River and Cedar River National Grasslands comprise about 162,000 acres in northwestern South Dakota and southwestern North Dakota. There are no constructed trails and no developed campgrounds on the Grand River and Cedar River National Grasslands. Hunting is the most popular recreation activity, although camping and picnicking do occur. Prairie dog viewing and shooting are also popular activities. Some warm-water fishing is available on small reservoirs, and limited river floating is available during highwater seasons. Total visitor use for all activities averaged 14,700 RVD's annually between 1992 and 1996.

At slightly over a million acres, the Little Missouri National Grassland is the largest national grassland. The Little Missouri River, one of the longest freeflowing rivers in the United States, is a state-designated scenic river and provides canoeing opportunities when water flows are up. Large, remote, unroaded tracts can still be found in the grasslands. The 120-mile Maah-Daah-Hey Trail on the Little Missouri National Grassland connects the North and South Units of Theodore Roosevelt National Park. There are three developed campgrounds and three developed picnic grounds. Hunting (big game, small game, and waterfowl) is the most popular activity, followed by motorized travel for viewing scenery. The Little Missouri National Grassland offers most of the elk and all of the bighorn sheep hunting in the State of North Dakota. Camping, hiking, and horseback riding are also popular activities.

Interstate 94 bisects the Little Missouri National Grassland and U.S. Highway 12 cuts through the southwest corner. Tourists are attracted to the three units of the Theodore Roosevelt National Park within the grassland boundary and to nearby Medora, North Dakota, a rebuilt cowboy town. The rugged badlands topography in the grasslands attracts



Big game hunting.

visitors. Lake Sakakawea, a major recreation resource, lies nearby to the north and east, and draws people to that area. Total visitor use for all activities averaged 96,000 RVD's annually between 1992 and 1996.

The Custer National Forest is located in northwestern South Dakota and in several blocks in southeastern and south central Montana. There are many roads, a few trails, six developed campgrounds, and a few fishing streams and ponds. In the west, the Ashland area with its twisted ravines, rounded hills covered with ponderosa pine, and large grassy areas is popular with thousands of hunters that annually search for white-tailed deer, mule deer, and wild turkeys. The easternmost portion of the Custer is grassy hills punctuated by massive limestone-capped buttes and is home to the second largest density of raptors in the United States. This area is popular with birders and hunters.

BLM lands in the Great Plains cover 6.9 million acres in the analysis area with approximately 4.9 million acres open seasonally or yearlong to motorized wheeled cross-country travel. Total recreation visitor use on these BLM lands was 521,000 visits in 1995. Hunting is the most popular recreation activity. Other popular recreation activities include camping, horseback riding, and motorized travel for viewing scenery. Most public lands in this region are undeveloped, however there are a few campgrounds, picnic areas, and small fishing reservoirs.

North American Prairie Region: The Sheyenne National Grassland (now part of the Dakota Prairie Grasslands) comprises about 70,000 acres in southeastern North Dakota and represents a remnant area of tallgrass prairie. This grassland contains one fishing stream, five fishing ponds, and a number of constructed roads and two-track prairie trails. A 25-mile portion of the North Country National Scenic Trail was constructed on this grassland. There are no developed recreation sites.

Big game and upland bird hunting and motorized travel for viewing scenery are the most popular recreation activities on this unit. Canoeing is popular on the Sheyenne River, which flows through parts of the grassland. Photography, horseback riding, and fishing are also summer recreation activities. The Fargo-Moorhead metropolitan area lies 50 miles from the grassland, and a fair number of people from that area recreate on the grassland. Total visitor use for all activities averaged 21,000 RVD's annually between 1992 and 1996.

ENVIRONMENTAL CONSEQUENCES

Assumptions

Most OHV use occurs on roads and trails. Only a small percentage of the total recreation OHV use occurs cross-country, but motorized wheeled cross-country travel does cause problems. For many recreationists, the effect of motorized wheeled cross-country travel is user conflicts and minimizing such travel would reduce the number and intensity of conflicts between motorized and nonmotorized recreationists.

Recognizing there would continue to be some intentional and unintentional cross-country travel, the analysis assumes that over time, through education and enforcement, most users would follow travel restrictions.

Presently, roads and trails, some of which are user-created, access the general areas where most recreation activities take place on public lands. Roads and trails already lead to most site-specific recreation spots, such as dispersed camping and picnicking sites, lake, stream, and pond access, shooting areas, historic mining areas, and viewing areas.

The sale of OHV's will increase as the population increases, based on the economic model discussed later in the Economics section of this chapter.

Effects Common to All Alternatives

The BLM and FS have defined recreation activities in sixty different categories, such as big game hunting, ice fishing, tent camping, riding ATV's, etc. Using these definitions, no recreation activities would be eliminated by any of the alternatives. OHV use would still occur on roads and trails under all alternatives. Some of the recreation opportunities within an activity may change. No recreation users would be "locked out" from NFS and BLM lands, since access on roads and trails would remain the same. Effects on various aspects of recreation opportunities are covered under the alternatives.

Under all alternatives, disabled access will be allowed per the Rehabilitation Act of 1973. At the field office or ranger district level, each request will be evaluated on a case-by-case basis as specified by the Rehabilitation Act.

No Action Alternative

Under the No Action Alternative, user conflicts would continue to increase as more motorized recreation occurs on public lands that are open and unrestricted to motorized wheeled cross-country travel. Motorized recreation use is increasing, as shown in the Economics section, and as this use increases, more people would travel cross-country in places where they are allowed. On BLM and NFS lands, conflicts from motorized wheeled cross-country travel would only be reduced when site-specific planning is completed and implemented or when emergency closures are put into effect. The size of these site-specific planning areas would vary and may be a watershed, mountain range, ranger district or field office, or a project area such as a timber sale.

Nonmotorized recreationists would continue to have their recreation experiences reduced by the noise, exhaust fumes, and wheel tracks left behind from motorized wheeled cross-country travel. Noise spoils the solitude that many nonmotorized recreationists are seeking, especially in remote areas. In the Rocky Mountain Region (western and portions of central Montana) there are many areas where motorized wheeled cross-country travel is not allowed. Some of these areas are entirely closed to motorized vehicles, while others have designated routes open to a variety of motorized vehicles within them. People seeking solitude or a quiet recreation experience can usually find the recreation experience they are looking for in one of these areas, however, these areas may not be close to where they are or have desirable settings or attractions that make people willing to travel to them. Areas that are nonmotorized or contain nonmotorized trails are generally not available on the Great Plains and North American Prairie NFS and BLM lands, where most of the area (approximately 75%) is presently open to motorized wheeled cross-country travel seasonally or yearlong.

Cross-country motorized recreation opportunities would continue under this alternative. Motorized recreationists who prefer to stay on roads and trails would continue to be impacted by those recreationists traveling cross-country on motorized vehicles and not practicing Tread Lightly! principles of staying on existing routes and minimum impact.

Disturbance of the natural appearing landscape by user-created roads and trails would continue to have an effect on visitors who find the disturbance unsightly, objectionable, and reduces the visual enjoyment of public lands. Depend-

ing on location and management area objectives, many additional user-created routes made by people traveling cross-country would not meet land management objectives for scenic values in the foreground and middleground viewing areas.

People affected during hunting seasons are those hunters whose methods of accessing, scouting, stalking, and retrieving are by foot or horse and, to some extent, those motorized hunters who stay on roads and trails. Their hunting experience is reduced or spoiled by other hunters using motorized vehicles to travel cross-country to scout for game, access favorite hunting areas, drive or chase game for a better shot, and retrieve game. Contributing to this diminished hunting experience is the noise created by motorized vehicles that disturbs and displaces game animals from the immediate area. The effects are more pronounced where motorized wheeled cross-country use is more common, such as the flatter and more open country of the Great Plains, the prairie of eastern North Dakota, and along portions of the continental divide. Fewer hunters are affected in the heavily timbered and/or steeper areas of western Montana where there is less opportunity for motorized wheeled cross-country travel and many areas are already closed or restricted yearlong (see maps).

In the Rocky Mountain Region and in the Missouri River breaks area, there are many areas where motorized wheeled cross-country travel is not allowed during the hunting season. Some of these areas are entirely closed to motorized vehicles while others have designated routes open to a variety of motorized vehicles. Hunters seeking a walk-in or quiet hunting experience can usually find the recreation experience they are looking for in one of these areas, however, these areas may not be in the geographic area where they prefer to hunt. These same types of quiet or nonmotorized hunting opportunities are generally not available in the Great Plains and North American Prairie NFS and BLM lands, where most of the area is open to motorized wheeled cross-country travel.

There would be no effect on people with disabilities and those people not physically fit to walk distances, because the same opportunities for motorized travel would continue to be available.

Alternative 1

The effects of this alternative would not eliminate recreation activities, such as driving for pleasure, rock hounding, or driving motorcycles or ATV's, but would influence some aspects of various recreation activities. For OHV users, this alternative would eliminate recreational experiences associated with cross-country driving. It would also limit driving to a camp spot to within 50 feet of a road or trail

by the most direct route. In many situations this would make it difficult for campers to get far enough off the road to avoid the noise and dust from passing traffic. In the recreation activity of motorcycle riding, some motorcyclists, especially in open grassland country, like to ride on and follow cow trails as part of their sport. This cow trail riding by motorcyclists would mostly be eliminated, except for cow trails that also meet the definition of a single-track trail as defined in Chapter 2. Some people may view these changes as a loss of recreation opportunity.

Most public lands would still be accessible by motorized vehicles under this alternative, as the road and trail network is generally dense enough that people do not have to walk more than a mile or two to reach a road or trail. Some people may view these changes as a loss of recreation opportunity. Restricting motorized wheeled cross-country travelers to roads and trails would have little or no effect on motorized visitors who only use roads and trails now. There would be some loss of motorized access to public lands where there is no legal access by road or trail and where cross-country travel has been used to access NFS and BLM lands.

Because motorized recreation use on roads and trails is allowed during the interim period, little or no displacement of motorized recreationists from public land to adjacent private land is anticipated. Displacement has the greatest probability of occurring if site-specific planning closes or greatly reduces roads and trails available for motorized use within a geographic area.

User conflicts caused by motorized wheeled cross-country travel would be reduced substantially by this alternative. Recreational experiences of nonmotorized recreationists would improve under this alternative. With a reduction in noise, the solitude that many nonmotorized recreationists are seeking should increase in remote areas away from motorized roads and trails. Motorized users who practice Tread Lightly! principles (i.e., stay on existing travel routes and minimum impact) would not have their recreation experiences reduced by impacts from motorized wheeled cross-country travelers.

Disturbance of the natural appearing landscape from past roads and trails created by motorized wheeled cross-country travel would continue to have an effect on visitors who find the disturbance unsightly, objectionable, and reducing their visual enjoyment. Additional disturbance caused by motorized wheeled cross-country travel would be minimized.

Under this alternative, the effect on hunters would vary depending on the experiences they seek. Motorized hunters who drive cross-country to access, scout, stalk, and retrieve game would have a change from their present unrestricted

hunting experience to one that restricts them to roads and trails. Hunters whose methods of accessing, scouting, stalking, and retrieving game animals are by foot or horse would have their recreation experience improved by the elimination of noise that disturbs and, potentially, displaces game animals from the immediate area. The effects are more pronounced in the flatter and more open country where motorized wheeled cross-country use is more common.

Restricting motorized wheeled cross-country travel would allow damaged areas to revegetate. This healing over time should improve the visual impression and contribute to a more satisfying recreation experience.

Alternative 2

Alternative 2 would have similar effects as Alternative 1 with the following exceptions. Driving to a camp spot would be limited to 300 feet (rather than 50 feet) by the most direct route from a road or trail, allowing people to get further away from the traffic and dust and affording more privacy. Motorized wheeled cross-country travel would be allowed for big game retrieval in the Great Plains area of Montana covering the Custer National Forest with the exception of the Beartooth Ranger District and the BLM Billings, Malta, Miles City, and Lewistown Field Offices with the exception of the Great Falls Field Station. Allowing motorized wheeled cross-country travel for big game retrieval would continue to result in some conflicts between motorized and nonmotorized hunters. The frequency of these conflicts would be low because people cannot use motorized vehicles to hunt cross-country, but can only retrieve a big game animal in possession.

Alternative 3

The effects covered under Alternative 2 apply to the Lewis and Clark, Helena, Beaverhead-Deerlodge, Gallatin, and Custer National Forests, Dakota Prairie National Grasslands, and the Dillon, Butte, Great Falls, Billings, Malta, Miles City, Lewistown, North Dakota and South Dakota BLM Field Offices. The exception to Alternative 2 is that hunters would only be allowed to drive cross-country for game retrieval between the hours of 10 a.m. and 2 p.m. Hunters who shoot their game late in the day and want to retrieve it by motorized vehicle would have to wait until the following day. Since the majority of big game hunting occurs in the morning and evening hours, this alternative would reduce user conflicts. Individuals who wish to drive to retrieve game would not be allowed to do so when others are hunting during prime hours.

The effects covered by the No Action Alternative apply to the other areas since there is no change from the current direction. However, there is generally less opportunity for

motorized wheeled cross-country travel in the Kootenai, Flathead and Bitterroot National Forests because of timber cover, heavy forest undergrowth and brushfields, and/or steep slopes. Therefore, effects on both motorized and nonmotorized recreationists are minimal.

Alternative 4

The effects identified under the No Action Alternative apply from June 15 to August 31 and December 2 to February 15 when motorized wheeled cross-country travel is allowed. In the Rocky Mountain Region these effects would occur primarily during the June 15 to August 31 open season when most of the people are using the areas. Fewer nonmotorized recreationists are affected in the Great Plains and North American Prairie regions during this open time, as the majority of use in these regions occurs during the fall hunting season when cross-country travel would be prohibited. This alternative would not allow motorized hunters to drive cross-country to access, scout, stalk, and retrieve game.

The effects on recreationists during the restricted period September 1 to December 1 and February 16 to June 14 are similar to the effects in Alternative 2 with some exceptions. Motorized wheeled cross-country game retrieval is allowed in all NFS and BLM lands. For public lands in the Great Plains and North American Prairie regions, this alternative precludes motorized wheeled cross-country travel during the fall hunting season when most motorized wheeled cross-country travel occurs in this area. During the periods when visitors are allowed to drive cross-country there would be some use, although the amount would be minimal.

Alternative 5

Alternative 5 has the same effects as Alternative 2 except those associated with motorized wheeled cross-country travel for game retrieval, which would not be allowed within any NFS or BLM lands.

Cumulative Effects

The effects on the settings and recreation activities are for the interim period until site-specific planning takes place. Cumulatively, under Alternative 1, motorized wheeled cross-country travel would be restricted on most public lands in the analysis area (Table 3.2). These lands would be added to lands already closed or restricted to motorized wheeled cross-country travel in the three states. Public lands already closed or restricted to motorized wheeled cross-country travel include all Montana, North Dakota and South Dakota state lands, federal wildlife refuges, and areas managed by the National Park Service. Some motorized

wheeled cross-country travel is permitted on designated areas of Bureau of Reclamation lands. Those looking for motorized wheeled cross-country travel opportunities would have to use one of the six OHV intensive use areas or other public lands open to motorized wheeled cross-country travel.

For Alternative 2, the cumulative effects are the same as the cumulative effects for Alternative 1 with the exception of allowing game retrieval on BLM and Custer National Forest lands in the eastern portion of Montana (Table 3.2).

The cumulative effect of Alternative 3 is that most public lands in the three-state analysis area east of the continental divide would be off limits to motorized wheeled cross-country travel (Table 3.2). These lands would be added to lands already closed or restricted to motorized wheeled cross-country travel in the three states. Public lands already closed or restricted to motorized wheeled cross-country travel include all Montana, North Dakota and South Dakota state lands, federal wildlife refuges, and areas managed by the National Park Service. Some motorized wheeled cross-country travel is permitted on designated areas of Bureau of Reclamation lands.

The cumulative effect of Alternative 4 is that recreationists would have more seasonal motorized wheeled cross-country restrictions placed on their activities (Table 3.2). Continued alterations to recreation settings may occur from additional user-created roads and trails.

For Alternative 5, the cumulative effects are the same as the cumulative effects for Alternative 1 (Table 3.2).

Comparison of Alternatives

Recreationists can be separated into motorized and nonmotorized. The No Action Alternative is the most desirable for motorized recreationists, followed by Alternative 4 and then Alternative 3. Alternatives 1, 2, and 5 would be the least desirable for motorized recreationists. For nonmotorized recreationists, the benefits of the alternatives are reversed where Alternatives 1, 2, and 5 are the most beneficial, followed by Alternative 3, then Alternative 4. The No Action Alternative would be the least desirable for nonmotorized recreationists.

The No Action Alternative has the most detrimental effects to recreation experiences by contributing to conflicts between users. Because Alternative 4 leaves the summer season open to motorized wheeled cross-country travel, it has the next most detrimental effects to recreation experiences. Those motorized users that travel cross-country may feel they are losing some opportunities for their recreation activity with Alternatives 1, 2, and 5.

Table 3.2 FS and BLM Cumulative Acres Limited/Restricted or Closed to Motorized Wheeled Cross-Country Travel

	<i>No Action</i>	<i>Alternative 1</i>	<i>Alternative 2</i>	<i>Alternative 3</i>	<i>Alternative 4</i>	<i>Alternative 5</i>
Current Acres Closed Yearlong	4,923,000	4,923,000	4,923,000	4,923,000	4,923,000	4,923,000
Current Acres Limited/ Restricted Yearlong	5,648,000	5,648,000	5,648,000	5,648,000	5,648,000	5,648,000
Additional Acres Limited/ Restricted Yearlong	0	16,031,000	16,031,000	12,478,000	0	16,031,000
Total	10,571,000	26,602,000	26,602,000	23,049,000	10,571,000	26,602,000

The No Action Alternative has the greatest effect on recreation settings. The continuation of user-created roads and trails could lead to more roads and trails that may need to be reclaimed when site-specific planning is completed. Since there would be the potential for more roads and trails, it would take longer to reclaim the roads and trails not needed for a permanent public land transportation system. Creation of more user-created roads and trails is possible in Alternative 4, but most likely, there would be fewer new roads and trails than the No Action Alternative. Under Alternatives 1, 2, and 5 additional user-created roads and trails would be less than the other alternatives, therefore there would be fewer to reclaim. Alternatives 1, 2, and 5 would allow damaged areas to revegetate.

INVENTORIED ROADLESS, RECOMMENDED WILDERNESS AND WILDERNESS STUDY AREAS

AFFECTED ENVIRONMENT

This section discusses those areas within the analysis area referred to as Inventoried Roadless Areas, Recommended Wilderness Areas, and Wilderness Study Areas.

Since 1970, the FS has inventoried and studied roadless areas greater than 5,000 acres and roadless lands, regardless of size, adjacent to existing wilderness. This inventory was updated and reevaluated during preparation of the current land and resource management plans known as forest plans. These roadless areas are referred to and tracked today as Inventoried Roadless Areas. Some of these areas were recommended for wilderness in forest plans and are referred to as Forest Plan Recommended Wilderness Areas.

In 1977, Congress passed the Montana Wilderness Study Act (P. L. 95-150). Congress identified specific areas to be

studied. These areas are tracked as Montana Wilderness Study Areas.

In the 1980's and early 1990's, the BLM went through a process of inventory, analysis, and recommendation for lands that could be included in the National Wilderness Preservation System. An EIS was completed and the report submitted to Congress. No motorized wheeled cross-country travel is allowed in any BLM Wilderness Study Area and no BLM Wilderness Study Area is part of the affected environment for this project.

As a minimum, all forest plans state that Forest Plan Recommended Wilderness Areas and Montana Wilderness Study Areas will be managed to maintain their existing wilderness character and potential for inclusion in the National Wilderness Preservation System. Not all Inventoried Roadless Areas in forest plans are intended to remain undeveloped. The desired future condition identified in forest plans for Inventoried Roadless Areas ranges from full development to Recommended Wilderness. FS policy requires that whenever a ground disturbing project is proposed within an Inventoried Roadless Area, the effects of that project on the roadless area must be analyzed and disclosed.

Current forest plan direction calls for many areas within FS Inventoried Roadless Areas, Recommended Wilderness Areas, and Montana Wilderness Study Areas to be closed to motorized wheeled cross-country travel yearlong. These lands are not part of the affected environment for this project. There are other lands within FS Inventoried Roadless Areas, Recommended Wilderness Areas, and Montana Wilderness Study Areas where current forest plan direction does not prohibit motorized wheeled cross-country travel yearlong. This amounts to approximately 3.4 million acres of Inventoried Roadless Areas, 169,000 acres of Forest Plan Recommended Wilderness Areas, and 430,000 acres of Montana Wilderness Study Areas. These lands are in-

cluded as part of the affected environment in this EIS. Forest Plan Recommended Wilderness Areas and Montana Wilderness Study Areas are mostly found within Inventoried Roadless Areas, but may also contain other adjacent lands. Effects of motorized wheeled cross-country travel identified in other sections of this chapter and exceptions to motorized wheeled cross-country travel restrictions identified under each of the action alternatives also apply to Inventoried Roadless Areas, Forest Plan Recommended Wilderness Areas, and Montana Wilderness Study Areas.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Users with the expectation that Montana Wilderness Study Areas would provide a given level of solitude may be offended by the presence of motorized recreationists. Agency officials generally view social effects (e.g. solitude) as transitory, as these forms of recreation would not be allowed if the Wilderness Study Area were designated as Wilderness (General Accounting Office 1993).

No Action Alternative

Under the No Action Alternative, current forest plan direction allows motorized wheeled cross-country travel to continue within Inventoried Roadless Areas, Forest Plan Recommended Wilderness Areas, and Montana Wilderness Study Areas where the forest plan does not now prohibit it. Motorized wheeled cross-country use may have an effect on the naturalness (physical characteristics) of Wilderness Study Areas (General Accounting Office 1993). The same effect on naturalness also applies to Forest Plan Recommended Wilderness Areas and Inventoried Roadless Areas. These effects can take the form of off-trail vegetation and soil damage, erosion, damage to riparian areas, pollution, and disturbance to wildlife (General Accounting Office 1993). These effects are all covered in other sections of this FEIS. Any effects under the No Action Alternative would probably remain until the area is reclaimed by agency action, because continued and increasing motorized wheeled cross-country travel would not allow areas where vegetation is damaged and/or soil is exposed to be reclaimed by nature.

Alternatives 1, 2, and 5

Under these alternatives, closing of the undeveloped areas to motorized wheeled cross-country travel would further enhance the protection of the physical naturalness of these areas. It should begin to allow nature to reclaim many areas where vegetation is damaged and/or soil is exposed.

Alternative 3

Under this alternative, the effects listed under the No Action Alternative would apply to the undeveloped areas that would remain open to motorized wheeled cross-country travel on Kootenai, Flathead, and Bitterroot National Forest lands. On the other national forests and grasslands, the undeveloped NFS lands that would be restricted to motorized wheeled cross-country travel would have the same effects as covered in Alternatives 1, 2, and 5 above.

Alternative 4

The effects of this alternative would be very similar to those associated with the No Action Alternative.

Cumulative Effects

Alternatives 1, 2, and 5 would take the remaining areas in Forest Plan Recommended Wilderness Areas and Montana Wilderness Study Areas where the forest plan does not currently prohibit motorized wheeled cross-country travel and restrict them yearlong, which would reduce the loss of naturalness so that the wilderness character would remain intact. It would also help protect the naturalness of Inventoried Roadless Areas that are not part of Wilderness Study Areas or Forest Plan Recommended Wilderness Areas. The No Action Alternative and Alternative 4 may pose a greater risk of not maintaining wilderness character on all forests. Alternative 3 would have a greater risk of not maintaining wilderness character on the Kootenai, Flathead, and Bitterroot National Forests.

Comparison of Alternatives

Alternatives 1, 2 and 5 are the most desirable for protecting the physical naturalness of undeveloped areas, to help maintain the wilderness character of Montana Wilderness Study Areas and Forest Plan Recommended Wilderness Areas, and to begin to allow nature to reclaim many areas where vegetation is damaged and/or soil is exposed. The next most desirable alternative for protecting naturalness and wilderness character is Alternative 3. The No Action Alternative and Alternative 4 are the least desirable for protecting naturalness and wilderness character.

SOCIAL

AFFECTED ENVIRONMENT

Introduction

This section focuses on demographic and social trends occurring in Montana, North Dakota and South Dakota. The following individuals and groups will be discussed: recreationists, environmental advocacy groups, ranchers/permittees, and rural communities.

Demographics and Social Trends

In 1998, the populations of Montana, North Dakota and South Dakota were each less than one million people, resulting in population densities of 6 people per square mile in Montana, 9 people per square mile in North Dakota, and 10 people per square mile in South Dakota. Montana's population grew by 10% from 1990 to 1998. In that same period, the population in North Dakota decreased by less than 1% and the population in South Dakota grew by 6%. In each of these states, rural areas tended to decline in population while larger urban areas tended to grow. (All population data is from the Department of Commerce, Bureau of the Census, various dates.)

In Montana, the larger population centers, where population is increasing, are located in the western and south-central parts of the state. Areas with declining populations tend to be located in the eastern and north-central parts of the state. Montana's population is expected to continue growing, primarily due to in-migration, and is projected to exceed 980,000 by 2010. Growth will continue to be higher in the population centers in western Montana than for the state as a whole.

In North Dakota, 46 of 53 counties lost population from 1990 to 1998. In general, major urban areas and reservations had higher population growth rates. The population of North Dakota is projected to increase to 677,000 by the year 2005, and to 704,000 by the year 2015.

In South Dakota, slightly over 40% of the counties have gained in population from 1990 to 1998. Counties that gained population are located in western South Dakota near the Black Hills, and in eastern South Dakota where some of the larger population centers are located. Counties that lost population tended to be those with smaller populations located in the east-central part of the state. The population of South Dakota is projected to increase to 810,000 by the year 2005 and to 840,000 by the year 2015.

There are seven Indian Reservations located in Montana, three in North Dakota, seven in South Dakota, and two that straddle the North Dakota/South Dakota border. In 1990, over 30,000 American Indians lived on Montana Indian Reservations, over 15,000 in North Dakota and nearly 34,000 in South Dakota. American Indian populations on reservations tend to be younger and grow faster than the non-Indian populations of the surrounding areas.

A trend that is common to all states is the aging of the population (Campbell 1996). The percentage of persons under 20 years of age will decrease and the percentage of people over 65 will increase over the next 30 years. As an example, in Montana, the percentage of population under 20 years old is projected to decrease from 30.2% in 1995 to 24.3% in 2025. Conversely, the percentage of population 65 and over is expected to increase from 13.1% in 1995 to 24.5% in 2025. This would translate into a Montana population over 65 that more than doubles in size between 1995 and 2025. The percentage of people over 65 is actually increasing more rapidly in states like Montana, North Dakota and South Dakota because young people are more likely to leave for advanced education, military service and employment opportunities not available locally.

The movement of people into some rural areas began in the 1970's and is expected to continue into the 21st century. This migration turnaround reflects a reversal of the rural-to-urban migration pattern found in most of the U.S. prior to the 1970's. Intermountain valleys in Montana, such as the Paradise Valley south of Livingston and the Bitterroot Valley south of Missoula, typically experience in-migration. In scenic areas, particularly those suitable for recreation, ranches are being sold for recreation uses or subdivided for homes. Some in-migrants buy smaller lots to ranch or farm but do not depend on an economic return from the property. Some of these rural areas are moving from a long-term economic dependency on agriculture or mining to a service-based economy. The population in-migration has increased contacts between longtime rural residents and newcomers whose beliefs and values may challenge the existing way of life. Long-time residents may feel they are losing control of their community, making it a less desirable place for them to live.

Other rural areas, particularly those on the Great Plains in eastern Montana, North Dakota and South Dakota, have continued to lose residents in the last decade. These communities typically have had economies based on agriculture, oil and gas, or other mineral development, and have suffered declines in population as agriculture lands became consolidated and mineral development came and left. Some of these communities have difficulty maintaining their local businesses as well as such services as schools and

health care. Residents are concerned about the economic survival of their communities and preserving their traditional lifestyles.

Another important trend is the increasing popularity of public lands for recreation. A recent comprehensive report on recreation by Cordell (1999) indicates demand in the Rocky Mountain West (which includes Montana, North Dakota and South Dakota) for the following activities will increase substantially (in days of demand) by the year 2050: nonconsumptive wildlife activities (94%), sightseeing opportunities (85%), fishing (59%), off-road driving (54%), hiking opportunities (44%), primitive camping (29%), backpacking opportunities (24%), and hunting (22%). Some of the major issues facing recreation include protecting resources and open space, acquiring more land to meet anticipated demand, resolving conflicts among different recreation users, and addressing the need for more access to outdoor recreation areas (USDA 1989).

Many communities are having problems maintaining access to public lands if access through closed private lands is required to reach public lands. In addition, loss of access to private lands is putting more pressure on public lands. Loss of access occurs for a variety of reasons: lands are purchased for recreation and home sites and closed to others, lands are leased to outfitters and closed to others, or lands are closed to avoid problems with safety, fire risk, cut fences, spreading weeds, litter and open gates.

Changing Attitudes

The proposed changes in the management of motorized wheeled cross-country travel on public lands are just one aspect of a broader debate on environmental issues and resource management that is occurring both in American society and globally. Social values for lands and natural resources take many forms, such as commodity, amenity, environmental quality, ecological, public use, spiritual, health, and security (Stankey and Clark 1991). In the past, natural resource management has tended to emphasize commodity values. The emerging emphasis on other values has forced a reevaluation of the commodity emphasis. Stankey and Clark's (1991) report states, "A new focus on the part of the public involves a shift from commodities and services to environments and habitats. The public is much more concerned about forests as ecosystems than they have been previously and is more concerned with having access to decisions about them."

A nationwide survey conducted by Roper Starch Worldwide (1998) offers some interesting information on attitudes toward environmental regulation. Respondents were asked whether they thought environmental laws and regulations had gone too far, had not gone far enough, or had

achieved the right balance. Almost three times as many respondents thought laws and regulations had not gone far enough (47%) as those who thought laws and regulations had gone too far (16%). Just over a quarter of the respondents (26%) thought the laws struck the right balance. In contrast to the nation as a whole, 29% of the respondents living in rural areas and 27% of the respondents living in the West stated that environmental regulation had gone too far.

A growing counter movement has been occurring in the West. In places where land use has been unrestricted, there is increasing concern regarding the control and management of public lands. People with these concerns feel that change in public land management is being driven by government officials and environmental advocacy groups who may not have a true understanding of the lands or the people living nearby who depend upon these lands for their livelihood and recreation. There is particular concern about the loss of traditional uses of the land, such as livestock grazing and motorized off-highway vehicle use. People with these concerns seek to balance what they consider to be "environmental extremism" with economic and human concerns. They may feel that local elected officials who deal with their problems on a daily basis are better equipped to make decisions about public lands.

Affected Groups

The groupings in this section are made to facilitate the discussion of social impacts. It should be noted that these groupings greatly simplify the members' actual values and attitudes. For instance, some ranchers engage in recreation and are particularly concerned about the environment. Recreationists may engage in motorized and nonmotorized types of recreation, and may have high levels of concern about the environment.

Recreationists: Research on the effects of participation in outdoor recreation shows such benefits as improved physical and mental health, increased self-esteem, and an enhanced sense of well-being and spiritual growth. Participation in outdoor activities can also increase family interaction and foster cohesion. Benefits to communities include increased social solidarity, satisfaction with community life, and increased ethnic and cultural understanding (USDA 1989). A survey of the American public on the effects of participation in outdoor recreation indicates that people who participate in active outdoor recreation are more satisfied with the quality of their lives in a wide variety of areas than is the general public (Roper Starch 1994).

Cordell and others (1999) have developed national and regional projections for a variety of outdoor recreation activities. In the Rocky Mountain region, about three million people participated in off-road driving in 1995. That

number is estimated to increase 17% by the year 2020. About five million people participated in hiking in 1995; that number is estimated to increase 24% by the year 2020. Nearly two million people participated in backpacking in 1995; that number is estimated to increase 18% by 2020. Finally, in the Rocky Mountain Region, two million people participated in hunting in 1995. That figure is estimated to increase 12% by 2020.

A study of Montana residents' trail use was conducted in 1994 by the Institute for Tourism and Recreation Research. This study was designed to be representative of the entire Montana population and included participants who engaged in walking for pleasure/day hiking, driving vehicles off-road for recreation, backpacking, using an ATV and motorcycling off-road. The average age of adult participants was concentrated in the late 30's and early 40's age groups for both motorized and nonmotorized activities with very little difference between the two types of activities. The oldest group was walkers with an average age of 45.



OHV recreation is a family activity. Photo courtesy of Montana Trail Vehicle Riders Association.

Respondents were asked about their motivations for taking a trail trip. The most important motivations were nature (be in a natural setting, understand the natural world better), physical fitness (improve my physical health, help keep me in shape), stress release (get away from my everyday responsibilities, help reduce or release some built-up tensions) and affiliation (so I could do things with my companions, be with others who enjoy the same things I do).

Survey respondents were also asked what other activities were compatible with the activity they participated in. Not surprisingly, backpackers and day hikers found other nonmotorized activities to be most compatible with their activity. In all cases, motorized users were much more likely to say their activity was compatible with day hiking and backpacking. Forty-five percent of the respondents agreed that conflicts on trails are relatively minor while 15% disagreed. Less than 2% of the respondents reported conflict with others during their most recent trail experience.

According to Boston and others (1997), "OHV recreation covers a huge range of activity from casual family use to intense competition; from use in the backyard to use on high mountains; wildland trail use to open desert. Enjoyment comes from use where the vehicle itself is the focus of the experience to the use of the vehicle as an enjoyable method of reaching or enjoying remote terrain; from a way to escape societal pressures to a way of sharing experiences with family or friends; from casual to organized activities."

Based on comments received during scoping, motorized wheeled cross-country vehicle users participate in their activities in Montana, North Dakota and South Dakota as a way for families and friends to enjoy the beautiful backcountry scenery together. They believe it has helped their children grow into responsible citizens and passing these activities on to future generations is important. They indicated they enjoy the sport for many of the same reasons opponents say their activities should not be allowed, i.e. the chance to enjoy the beauty of nature and spend time away from the masses; they just prefer to participate in these activities using motorized vehicles. They feel they are being forced out of forests by more restrictive rules and regulations. Some indicated that with the increasing population more places, rather than fewer, need to be open to motorized activities. Some rely on motorized wheeled cross-country travel to retrieve game during hunting season. Many OHV users indicated they have a great respect for the land and try to be courteous when traveling. They feel the few people who do not follow the rules are giving all motorized wheeled cross-country travelers a bad name. Some even indicated a need for some restrictions on cross-country use.

The following concerns were identified by motorized wheeled cross-country users during the scoping period: loss of access to areas traditionally used for these activities, damage being unfairly blamed on motorized wheeled cross-country vehicle use, and planning focused on a large area rather than on particular problem areas. Some of these recreationists indicated they are not concerned with this preliminary step, but feel it is only the beginning and that trail and road closures would follow during the next phase. These commenters support exceptions for game retrieval, disabled access and hunting, although some mentioned fairness for all as an issue. OHV users generally indicated they did not experience conflicts with other users.

Based on comments received during scoping for the OHV EIS/plan amendment, the prime motivation of nonmotorized users appears to be a quiet, peaceful experience in beautiful surroundings away from the rushing and crowding of everyday life. Some indicated that there are fewer and fewer places to “get away from it all” and that protecting what peace is still available is important to the quality of experiences on public lands. Controlling OHV use is a major factor in assuring that peace in the future for them.

Nonmotorized user concerns revolve around conflicts with motorized users. These concerns included noise, the smell of exhaust, dust, safety issues, wildlife displacement and harassment, and resource damage. Some commenters indicated that motorized and nonmotorized uses are not compatible; when motorized use begins in an area, the nonmotorized users go elsewhere. Some nonmotorized users indicate they feel a loss of their personal freedom if they are forced to go to an alternative area to find solitude and quiet.

Some hunters also feel that motorized wheeled cross-country use negatively affects their hunting experience. The results of a survey published by Montana Fish, Wildlife and Parks (1998a) show improper vehicle use/road hunting is one of the top behavior problems witnessed by respondents in the 1997 hunting season. Nearly half of the respondents mentioned this problem. Respondents were also concerned about the widespread use of ATV's and their negative impact on the sport of hunting.

Research (Williams 1993a) shows that the following factors influence the likelihood of conflict: activity style, resource specificity, mode of experience and tolerance for lifestyle diversity. Activity style refers to the significance the person attaches to the activity. Conflict is much more likely to occur if the activity is an integral part of the person's lifestyle rather than an occasional activity. Resource specificity refers to the significance a person attaches to using a specific resource. Conflict is more likely to occur when the person has a special relationship with a



Motorized and non-motorized uses often occur in the same area.

place and perceives others are disrupting the traditional uses of the place or devaluing its meaning. Mode of experience refers to the way in which the environment is perceived. Conflict is more likely to occur when the person perceives the environment as part of the experience rather than as a backdrop for the experience. The last factor is tolerance for lifestyle. Conflict is more likely to occur when the user has a higher tendency to reject lifestyles that are different than one's own. Examples include a preference for mechanized versus nonmechanized or consumptive versus nonconsumptive activities.

Noise is a major issue to many nonmotorized users. Most of the scoping comments that indicated conflict as a problem specifically mentioned noise as being one of the major contributors to the conflict. In addition to the idea that nonmotorized users engage in recreation for the serenity, solitude and quiet that it offers, many are also concerned about the effects of noise on wildlife. Some of these users also mentioned their concern about the loss of an alternative to the world in which we live, where the noise of engines is all-pervasive, and the need to protect areas where natural quiet can be experienced.

Some commenters discussed the amount of space taken up by these vehicles, indicating they do not just occupy the space in which they are moving, but also a much larger space surrounding the vehicle; i.e. it only takes one motorized vehicle to fill a whole basin with the sound of the machinery. A noise study conducted by the USDA (1993) indicated that while a motorcycle at a distance of 400 feet or more would not cause sounds loud enough to impact a person's hearing, the sounds produced by five motorcycles ridden on typical motorcycle trails are detectable, at least occasionally, up to one-half mile away.

Research confirms the importance of noise to recreationists. According to Gramann (1999), “Many surveys show that

quiet, solitude and natural sounds play important roles in recreation experiences. Recreation area users consistently state that escaping noise and enjoying the sounds of nature are among the important reasons they visit natural areas.”

The aging of the analysis area population is discussed at the beginning of this section. The available research indicates that participation in outdoor activities changes as people age. However, it is unclear how recreation choices will change as the “baby boomer” generation ages. As Hornback (1991) indicates, “Though aging is the prime social trend of the next two decades, we have little understanding of how the leisure sequence unfolds as people age. Do bikers turn into guests at dude ranches or go on ‘ecocruises’?”

Numerous comments were received about the aging population as it relates to this proposal. Some comments indicated the needs and desires of the older population should be accommodated and that closing areas to motorized wheeled cross-country travel would restrict access for older people to hunting, fishing, sightseeing and prospecting areas, etc. Other comments indicated that at some point the time comes when people are unable to access the backcountry for peace and solitude by foot or horse and access to those areas must end, just as any other athlete faces the day when they must pass the legacy to their children, grandchildren and those more physically able. In this way, those who can still travel to backcountry areas can enjoy them unspoiled and quiet. Still others indicated they will continue to access these areas as they become older but they will travel in a much slower manner than when they were younger.

The demand for motorized disabled access has, to date, been mainly associated with hunting. However, the 2000 Vision for Montana State Parks (Montana Fish, Wildlife and Parks 1998b) indicates the number of disabled Americans participating in outdoor recreation is increasing, along with the demand for more accessible recreation opportunities. The State of Montana issues permits to hunt from a vehicle for persons who are 100% disabled. In the last few years, 1,000 to 1,200 permits have been issued annually. Several national forests and grasslands have access hunter programs but no formal programs for disabled access other than hunting.

Environmental Advocacy Groups: Based on the comments received during scoping, environmental advocacy groups and associated individuals support a more restrictive policy for motorized wheeled cross-country use, and most feel vehicle use should be restricted to designated and signed roads and trails. New routes should be designated only after public review and completion of travel plans by both agencies. Some of the reasons given for these views include problems with erosion, vehicle pollution, spread of noxious weeds, disturbance to other recreationists, wildlife

habitat destruction and fragmentation, and disturbance to native plant communities. Some commenters feel these problems are occurring because the population is increasing, which puts greater pressure on the natural environment.

Some groups indicated the proposal as outlined violated the National Environmental Policy Act (NEPA) and other regulations, and that under this proposal, travel planning would take too long to complete and implement. Concern regarding collaborative processes and cost share agreements with private groups that give any group a special “right” or promote commercialization was also indicated during scoping. Specifically mentioned were projects funded by the motorized recreation industry that would have a vested interest in promoting motorized wheeled cross-country use.

A major concern is the perceived legitimization and continued use of user-created roads and trails that may have been developed through unauthorized means. There is concern that more roads and trails would be developed before travel plans are in place that could prohibit their use. Many indicated that these user-created roads and trails should be closed and revegetated.

Few of these commenters offered opinions on whether exceptions for motorized wheeled cross-country travel for game retrieval, disabled access and/or camping should be allowed. Those that did comment indicated enforcement problems would make these exceptions unworkable.

The condition of resources on public lands is important to the environmental advocacy groups because they value these resources for recreation, wildlife, scenic and spiritual qualities, and a variety of other reasons. Many appreciate just knowing that these areas exist and feel federal agencies have an obligation to manage these resources for future generations.

Ranchers/Permittees: Permittees feel they face increasingly stressful social and economic situations as they try to balance their traditional lifestyles with demands from government agencies and other public land users such as recreationists. Some permittees refuse to let hunters or recreationists cross their private land to gain access to adjacent public lands. The problems prompting these refusals include people driving cross-country and damaging grass, spreading weeds, cutting fences, leaving litter and leaving gates open.

Ranchers increasingly rely on four-wheel drive vehicles and ATV’s to deliver feed, salt and supplements to cattle, mend fence, and herd cattle. ATV use has increased dramatically in the past ten years in Montana, North Dakota

and South Dakota with the introduction of the four-wheeled ATV (see Economics section). For all BLM permittees, permission to travel off-road for activities associated with the administration of their permit is implied rather than explicitly stated in the lease. For FS permittees, the situation varies by ranger district.

Rural Communities: Rural communities are facing many challenges. Residents of rural areas believe they are engaged in a struggle to maintain control of their community's character, rather than to control the frontier as in the past. Many groups, including both newcomers and longtime residents, want to maintain the traditional rural character.

Some rural areas, such as those in eastern Montana, North Dakota and South Dakota, have continued to lose residents in the last decade. These communities may be having difficulty maintaining their local businesses and services, such as schools and health care. Residents are concerned about preserving their current lifestyles and the economic survival of their communities. This leads to concern about any government activity that could affect the local economy. They may feel that change in public land management is being driven from the outside by government officials and environmental advocacy groups that have little understanding of local customs and culture. These communities often have a limited ability to react to change because of their small population base (Harris and others 1996).

Other rural areas, such as those in western Montana, are struggling to maintain their rural character in light of high levels of in-migration and economic change from an agricultural to a recreational base. Residents of these communities worry they are "losing their quality of life because of more people, more traffic, and more unplanned haphazard development" (Williams 1993b). At the same time, many communities resist zoning and planning.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Under all alternatives, the social impacts are described in terms of effects to social well-being. The type of things that could affect social well-being include the amount and quality of available resources, such as recreation opportunities and resolution of problems related to resource activities. Other less tangible beliefs that could affect social well-being include individuals having a sense of control over the decisions that affect their future, and feeling that the government strives to act in ways that considers all stakeholders' needs.

Under all alternatives, disabled access will be allowed per the Rehabilitation Act of 1973. Evaluation of specific requests for access will be made on a case-by-case basis at the field office or ranger district level.

No alternative would affect the demographic or major social trends within the analysis area.

No Action Alternative

Effects to all groups would continue as they have in the past because management of motorized wheeled cross-country activities would not change. This alternative is most responsive to the desires of individuals and groups who feel public lands should remain open to motorized access at the current levels. This alternative best addresses their concerns and would enhance their social well-being. This alternative is most responsive to rural communities whose residents would prefer that current activities on public lands are not limited.

This alternative would give the older population an opportunity to switch from activities such as hiking to less strenuous activities, such as motorized wheeled cross-country vehicle use, as they age. However, there is no clear evidence that people would choose to make this type of change as they age.

Because the noise issue is not addressed in this alternative, conflicts between motorized wheeled cross-country users and other types of recreationists would continue and, perhaps, increase in the future as the number of people recreating on public lands increases. The quality of hunting for some hunters would continue to be disturbed by motorized wheeled cross-country use. People engaged in hiking and other types of nonmotorized recreation would also continue to be affected. Conflicts between ranchers/permittees and motorized wheeled cross-country users would not be addressed by this alternative. These conflicts could diminish the social well-being of affected individuals.

The environmental advocacy groups and many of the people associated with these groups would not support current management because they believe it does not sufficiently protect the resources on public lands. The condition of the resources on public lands is important to these people because they value these resources for recreation, wildlife, scenic and spiritual qualities, and a variety of other reasons.

An increasing number of people in the West and across the country believe that motorized wheeled cross-country vehicle management should place more emphasis on protecting natural resources. This alternative is not consistent with these attitudes.

Alternative 1

Under this alternative, all motorized wheeled cross-country vehicle use would be prohibited with one exception allowed camping within 50 feet of a road or trail. This alternative is most responsive to the desires of individuals and groups who feel motorized vehicle use on public lands should be limited to roads and trails with very limited exceptions. Nonmotorized recreation users would benefit from a reduction in conflicts with motorized wheeled cross-country users, which could enhance their recreation experiences and social well-being. People who engage in motorized wheeled cross-country activities would lose that opportunity on public lands, which could diminish their social well-being. However, they would still be able to use their vehicles on roads and trails. Although little or no social impacts would occur to rural communities, this alternative is not consistent with their preference for leaving activities on public lands at current levels.

This alternative would not give older people an opportunity to substitute motorized wheeled cross-country travel for activities that require more mobility, such as hiking or mountain biking. However, there is no clear evidence that this is what people would choose to do as they age.

Conflicts between motorized wheeled cross-country users and other types of recreationists would be addressed by this alternative, at least partly because noise levels in areas away from roads and trails would diminish. The quality of hunting would be enhanced for those who desire a nonmotorized experience. However, hunters would not be able to drive cross-country to retrieve game, which may be a concern for some. The quality of the recreation experience for those engaged in nonmotorized recreation would be enhanced. However, the exception of camping within of 50 feet of a road or trail may not provide quality experiences for this activity. Reductions in conflict and the resulting enhanced recreation experience could result in increased levels of social well-being for affected individuals.

Conflicts between motorized wheeled cross-country users and ranchers/permittees would be addressed by this alternative, which could enhance the social well-being of the affected individuals. Permittees may be able to travel cross-country on permit-related business if authorized by their permit. However, the final decision would be up to the authorized officer on a case-by-case basis.

The environmental advocacy groups and many of the people associated with these groups may not feel this alternative goes far enough to protect the resources on public lands because it does not deal with the issue of user-created roads and trails. The condition of the resources on public lands is important to these people because they value

these resources for recreation, wildlife, scenic and spiritual qualities, and a variety of other reasons.

An increasing number of people in the West and across the country believe that cross-country vehicle management should place more emphasis on protecting natural resources. This alternative is consistent with these attitudes.

Alternative 2

The effects of this alternative would be similar to Alternative 1. However, exceptions would be allowed for game retrieval (in eastern Montana) and camping within 300 feet of a road or trail.

This alternative would not give older people the opportunity to substitute motorized wheeled cross-country travel for activities, such as hiking, that require more mobility. However, there is no clear evidence that this is what people would choose to do as they age.

Conflicts between nonmotorized and motorized hunters could continue in some areas due to the game retrieval exception, which could diminish the social well-being of affected hunters. There is some concern that the exceptions allowed for game retrieval would be difficult to enforce and some people would continue to drive anywhere they wanted.

There would be no effect to permittees and lessees in their use of motorized wheeled cross-country travel to administer their permit or lease.

Alternative 3

Under this alternative, in eastern Montana, North Dakota and South Dakota, all OHV use would be limited to roads and trails with exceptions for game retrieval and camping. For eastern Montana, North Dakota and South Dakota, the effects would be very similar to Alternative 2. Western Montana would be left open for motorized wheeled cross-country travel and the effects there would be similar to the No Action Alternative. However, motorized access for game retrieval would be restricted and some conflicts reduced, which could enhance the social well-being of affected hunters.

Alternative 4

Under this alternative, all OHV use would be seasonally restricted to roads and trails with exceptions for game retrieval and camping. When areas are restricted, nonmotorized recreation users could benefit from a reduction in conflicts with motorized wheeled cross-country users, which could enhance their recreation experiences

and social well-being. Motorized wheeled cross-country vehicle users would lose the opportunity to participate in that activity on public lands during the spring and fall, which could diminish their social well-being. However, these motorized wheeled cross-country opportunities would still be available during the other seasons. Although no social impacts would occur to rural communities, this alternative is not consistent with their preference for leaving activities on public lands at current levels.

During the winter and summer seasons, this alternative would give the older population the opportunity to switch from activities that require more mobility such as hiking to less strenuous activities, such as motorized wheeled cross-country vehicle use. However, there is no clear evidence that people would choose to make this type of change as they age.

During the hunting season in eastern Montana, conflicts between motorized wheeled cross-country users and other types of recreationists would be addressed by this alternative, at least partly because noise levels in areas away from roads and trails would diminish. The quality of hunting would be enhanced for those who desire a nonmotorized experience. There is some concern that the exceptions allowed for game retrieval and ranching activities related to the management of a permit would be difficult to enforce, and some people would continue to drive anywhere they wanted. To the extent that conflict is reduced and the resulting recreation experience enhanced, increased levels of social well-being could result.

During the times of highest use in western Montana, people engaged in hiking and other types of nonmotorized recreation would continue to be affected by conflicts with motorized wheeled cross-country users. Noise from vehicles and related conflicts would continue and, perhaps, increase in the future as the number of people recreating on public lands increases. This could diminish the social well-being of affected individuals.

Conflicts between ranchers/permittees and motorized wheeled cross-country users would be reduced during the fall and spring, but would continue to occur during the summer months. To the extent that conflict is diminished, this alternative would enhance the social well-being of affected individuals.

The environmental advocacy groups and many of the people associated with these groups would not feel this alternative goes far enough to protect the resources on public lands because it restricts areas seasonally rather than yearlong, and it does not deal with the issue of user-created roads and trails. The condition of the resources on public lands is important to them because they value the resources

for many reasons, such as recreation, wildlife, scenic and spiritual qualities.

An increasing number of people in the West and across the country believe that OHV management should place more emphasis on protecting natural resources. This alternative is consistent with these attitudes. However, some people may feel it does not go far enough.

There would be no effect to permittees in their use of motorized wheeled cross-country travel to administer their permit.

Alternative 5

Under this alternative, all motorized wheeled cross-country vehicle use would be prohibited with an exception for campsites within 300 feet of a road or trail by the most direct route. Nonmotorized recreation users would benefit from a reduction in conflicts with motorized wheeled cross-country users, which may enhance their recreation experiences and social well-being. People who engage in motorized wheeled cross-country activities would lose that opportunity on public lands, which might diminish their social well-being. However, they would still be able to use their vehicles on roads and trails. Although little or no social impact would occur to rural communities, this alternative is not consistent with their preference for leaving activities on public lands at current levels.

This alternative would not give older people the opportunity to substitute motorized wheeled cross-country travel for activities, such as hiking, that require more mobility. However, there is no clear evidence that this is what people will choose to do as they age.

Conflicts between motorized wheeled cross-country users and other types of recreationists would be addressed by this alternative, at least partly because noise levels in areas away from roads and trails should diminish.

The quality of hunting would be enhanced for those who desire a nonmotorized experience; however, hunters would not be able to drive cross-country to retrieve game, which may be a concern for some.

Conflicts between motorized wheeled cross-country users and permittees would be addressed by this alternative, which could enhance the social well-being of the affected individuals. There would be little effect to permittees in their use of motorized wheeled cross-country travel to administer their permit or lease. However, they would be expected to follow certain guidelines, such as avoiding riparian areas and steep slopes, and washing their vehicle after use in weed-infested areas.

The environmental advocacy groups and many of the people associated with these groups may not feel this alternative goes far enough to protect the resources on public lands because it does not deal with the issue of user-created roads and trails. The condition of the resources on public lands is important to these people because they value these resources for recreation, wildlife, scenic qualities, and a variety of other reasons.

Increasing numbers of people in the West and across the country believe that motorized vehicle management should place more emphasis on protecting natural resources. This alternative is consistent with these values.

Civil Rights

No civil rights effects associated with age, race, creed, color, national origin or sex have been identified.

Environmental Justice

During the course of this analysis, no alternative considered resulted in any identifiable effects or issues specific to any minority or low income population or community. The agencies have considered all input from persons or groups regardless of age, race, income status, or other social and economic characteristics.

Cumulative Effects

The expected increase in study area population and related increase in both motorized and nonmotorized recreation activities, particularly in western Montana, would, in general, lead to more conflicts among recreationists on roads, trails and areas that remain open to OHV use. The loss of opportunities for (or displacement to other areas of) nonmotorized users due to increases in conflict that occur on areas that are open to both motorized and nonmotorized users could be at least partially offset by the enhanced opportunities for nonmotorized recreation available under Alternatives 1, 2, 4 and 5, and in eastern Montana, North Dakota and South Dakota under Alternative 3. Under Alternative 3, this offsetting effect would not occur in western Montana. The loss of opportunities for nonmotorized users was also offset by opportunities available in areas that had been closed to OHV use prior to this effort.

Although very little of the motorized recreation use actually occurs off roads and trails, the fact that motorized wheeled cross-country travel has gradually been restricted on most public lands in the study area (see Recreation section, Cumulative Effects) would add to some motorized recreationists' concerns regarding control and management of public lands. Specifically, they may feel that public

land managers are not listening and/or responding to their wishes to keep public lands open to motorized use. All alternatives except the No Action Alternative could add to these feelings.

All of the alternatives except the No Action could also add to the concern of some residents of small rural communities about increased government control over public lands. All of the alternatives except Alternative 1 could add to the concern about protection of resources on public lands, and even under Alternative 1, concerns would remain about "user-created" roads and trails. All of the alternatives except the No Action could act to alleviate some of the conflicts between permittees and some other public land users, which are expected to increase in the future. All of the alternatives except the No Action would act to limit some of the motorized opportunities available to the older population. However, there is no evidence that people will substitute motorized wheeled cross-country travel for activities that require more mobility as they age

ECONOMICS

AFFECTED ENVIRONMENT

Introduction

To evaluate the economic conditions, the entire States of Montana, North Dakota and South Dakota have been considered. All counties of North Dakota and South Dakota are included in this evaluation, even though some of the counties may not be affected by this FEIS.

This section presents trends in employment and earnings by state, trends in per capita income by state, a summary of the economic trends, sales of new motorcycles and ATV's by state, per vehicle expenditures by OHV users, and trends in truck, motorcycles and ATV registration by state.

Economic Conditions

Employment Trends in Montana from 1987-1996: During this ten-year period, the largest number employed was in the Services sector, followed by the Retail and Government sectors. The number employed was much smaller for all other sectors. In terms of employment growth, all sectors of the economy showed positive employment growth rates during this ten-year period except for the Mining sector, which had a 1.4% per annum decline in employment. The Construction sector had the largest employment growth rate at 7.6% per year. Agriculture, Retail Trade, and Services had employment growth rates slightly greater than 4% per year. The remaining sectors (Manufacturing, Fi-

nance, Wholesale Trade, and Transportation/Public Utilities) had employment growth rates ranging from 1.2% to 2.4% (USDC 1998a and 1998c).

Trends in Earnings in Montana from 1987-1996: To accurately compare earnings across the ten-year period, all earnings have been adjusted to 1996 dollars using the Gross Domestic Product (GDP) Implicit Price Deflator (USDC 1998c). Earnings are defined to be labor and proprietors' earnings. The Services and Government sectors had earnings in excess of \$1.8 billion. All other industries had earnings ranging from \$40 million to approximately \$1 billion. In terms of earnings growth, the Construction sector had the highest growth rate at 6.7% per year. The Mining sector had the only negative growth rate, with 0.5% decline in earnings per year. The Finance and Services sectors had industry earnings growth of approximately 5% per year. All other sectors had earnings growth ranging from approximately 1% to 3.6% (USDC 1998a and 1998c).

Employment Trends in North Dakota from 1987-1996: Similar to trends in Montana, the largest number employed in North Dakota was in the Services sector, followed by the Retail and Government sectors. The number employed was much smaller in all other sectors. In terms of employment growth, all sectors of the North Dakota economy showed positive employment growth rates during this ten-year period except for the Mining sector, which had a 0.8% per annum decline in employment. The Agricultural sector had the largest employment growth rate at 5.3% per year. Manufacturing had employment growth of 4.2%, which was the second highest during this period. Construction and Services had employment growth of 3.8% and 3.7%, respectively. Retail Trade and Transportation had employment growth of 2.8% and 2.1%, respectively. All other sectors (Wholesale Trade, Finance, and Government) had growth rates of 1% or less during the ten-year time period (USDC 1998a and 1998c).

Trends in Earnings in North Dakota from 1987-1996: All earnings figures have been adjusted to 1996 dollars using the GDP Implicit Price Deflator (USDC 1998c). Earnings are defined to be labor and proprietors' earnings. The Services and Government sectors had earnings in excess of \$1.5 billion. All other industries had earnings ranging from \$30 million to approximately \$800 million. In terms of earnings growth, the Manufacturing sector had the highest growth rate at 4.9% per year. As was found in Montana, the Mining sector had the only negative earnings growth rate, with a 0.2% decline in earnings per year. Services, Construction, and Finance had earnings growth ranging from 3.6% to 3.8%. Retail Trade, Wholesale Trade, and Transportation had earnings growth ranging from 1.6% to 1.9%. Government experienced earnings growth of only 0.7% during this time period (USDC 1998a and 1998c).

Employment Trends in South Dakota from 1987-1996:

Consistent with Montana and North Dakota, the largest number employed was in the Services sector, followed by the Retail and Government sectors. As in Montana and North Dakota, all sectors of the South Dakota economy showed positive employment growth rates during this ten-year period except for the Mining sector, which had a 1.5% per annum decline in employment. The Manufacturing sector had the largest employment growth rate at 5.5% per year. Agriculture had employment growth of 4.7%, which was the second highest during this period. Construction and Services were ranked third and fourth, with employment growth of 4.7% and 4.4%, respectively. Retail Trade and Finance had employment growth of 3.7% and 3.3%, respectively. Transportation (2.5%), Wholesale Trade (1.6%) and Government (0.5%) experienced the lowest employment growth in South Dakota during the time period (USDC 1998a and 1998c).

Trends in Earnings in South Dakota from 1987-1996:

Earnings figures have been adjusted to 1996 dollars using the GDP Implicit Price Deflator (USDC 1998c). Earnings are defined to be labor and proprietors' earnings. As in Montana and North Dakota, the Services sector had the largest earnings, approximately \$2.5 billion. The Services sector also had the top ranked earnings growth at 6% per year during the time period analyzed. Manufacturing (5.9%), Agriculture (5.2%), Finance (5.3%) and Construction (5.0%) had earnings growth that were at least 5% per year. As was found in Montana and North Dakota, the Mining sector had the only negative earnings growth rate, with 1.1% decline in earnings per year. Retail Trade and Wholesale Trade had earnings growth of approximately 3%. Transportation and Government had the lowest positive growth rates, with growth rates of 1.9% and 1.6%, respectively (USDC 1998a and 1998c).

Trends in Per Capita Income from 1987-1996: All three states have shown moderate real per capita income growth. All income figures have been adjusted for inflation. For Montana, the per capita income growth rate was 1.7% per year. North Dakota and South Dakota had identical per capita income growth rates of approximately 2.3% per year. By 1996, Montana had a per capita income level that was approximately \$1,200 lower than North Dakota and \$1,400 lower than South Dakota. Figure 3.2 displays real per capita income for the three states affected by this FEIS (USDC 1998a and 1998c).

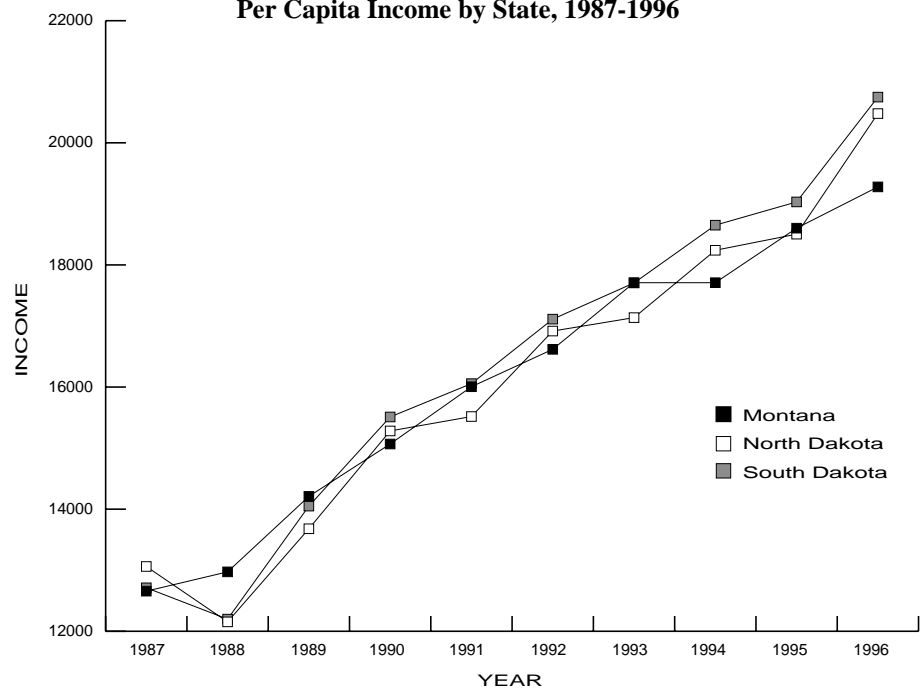
Summary of Economic Trends for Montana, North Dakota and South Dakota

In general, most economic sectors experienced moderate employment and earnings growth during the ten-year period analyzed. The only exception was the Mining sector,

which experienced negative growth rates in employment and earnings. This was due to declining metal commodity prices during this time period.

The Services sector is the largest employer and generator of earnings in Montana, North Dakota and South Dakota. In terms of growth rates, the Services sector outgrew all other economic sectors in South Dakota. In Montana and North Dakota, the growth rate in the Services sector was at least 4%. In general, these economies are following the national trend of the Services sector being the largest employer and generating high employment and earnings growth rates.

Figure 3.2
Per Capita Income by State, 1987-1996



Off-Highway Vehicle Economic Information

Sales of New Machines Used Off-Highway: Table 3.3 displays the sales of new ATV's, motocross bikes and enduros from 1990 to 1998. The annual sales growth rate for Montana was 6.7%. In North Dakota there was a 10.3% annual sales growth rate. In South Dakota the annual growth rate was 8.5%.

Table 3.3
Sales of New ATV's, Motocross Bikes and Enduros

Year	Montana	North Dakota	South Dakota
1990	2,700	900	1,200
1991	2,600	800	1,400
1992	3,200	900	1,300
1993	3,500	1,200	1,700
1994	NA	NA	NA
1995	3,500	1,534	1,842
1996	3,985	1,496	1,852
1997	4,260	1,674	2,344
1998	4,539	1,772	2,393

Source: 1990-1993 provided by Motorcycle Industry Council; 1995-1998 provided by American Honda. NA denotes data is not available.

OHV Expenditures: Table 3.4 displays OHV expenditures for trucks, off-road motorcycles, and ATV's. OHV users expend approximately \$1,460 per vehicle per year during off-highway vehicle use (Sylvester 1995). The largest expenditure is for gas and oil products, accounting for 47% of the total expenditure for the year. Equipment rental and purchase (15.6%), lodging (14.5%), and food and beverages (12.2%) combined account for approximately 42% of the total expenditure. The remaining five categories account for approximately 11% of the total expenditure.

Table 3.4
OHV Expenditures per Vehicle per Year

Expenditure Category	Expenditure (\$)	Percent of Total
Lodging	211.31	14.5
Food & Beverages	177.56	12.2
Gas & Oil	686.36	47.0
Equip. Rental & Purchase	227.86	15.6
Clothing	18.13	1.2
Film, Gifts & Souvenirs	17.191.2	
Other Entertainment	34.40	2.4
Entrance & Event Fees	15.78	.1
Other	71.76	4.9
Total	\$1,460.34	100.0%

Trends in Vehicle Registration: Table 3.5 displays the number of registered trucks, motorcycles, and ATV's in Montana, North Dakota and South Dakota during 1990 to 1998 (State Registration Bureaus, and Montana Fish, Wildlife and Parks, various years). The ATV and motorcycle registration information presented may be an understatement of the total number of motorcycles and ATV's in the

three-state area. Motorcycles and ATV's are used as work equipment on farms and ranches and may not be registered. For South Dakota, the number of registered trucks and ATV's was estimated, since the number of trucks and automobiles was not reported separately and the number of registered ATV's was not available.

Table 3.5 Number of Registered Vehicles

	<i>Montana</i>		<i>North Dakota</i>			<i>South Dakota</i>		
<i>Year</i>	<i>Trucks</i>	<i>ATV's & Motorcycles</i>	<i>Trucks</i>	<i>Motorcycles</i>	<i>ATV's</i>	<i>Trucks¹</i>	<i>Motorcycles</i>	<i>ATV's¹</i>
1990	268,466	7,399	170,853	20,113	2,414	204,671	23,719	2,863
1991	265,884	8,404	168,658	19,121	2,054	204,221	24,133	3,134
1992	274,512	10,020	169,942	18,030	2,568	211,713	23,389	2,998
1993	291,038	11,729	173,045	17,498	2,651	219,769	26,173	3,542
1994	295,373	13,165	177,342	17,026	3,468	227,195	25,822	NA
1995	299,104	14,072	178,956	16,338	3,375	230,961	25,155	3,735
1996	299,341	15,352	180,527	15,738	4,219	232,354	24,704	3,749
1997	303,425	16,898	180,997	15,319	3,894	237,425	24,561	4,417
1998	304,696	18,953	182,430	15,372	4,920	NA	NA	4,484

NA denotes data is not available.

¹Estimated values.

Trucks, motorcycles and ATV's can be considered the most likely vehicles used for off-highway use (Sylvester 1995). Based on a telephone survey conducted by the Bureau of Business and Economic Research at the University of Montana, Sylvester (1995) reports that approximately 9%

of the registered trucks, 9% of the registered motorcycles, and 100% of the ATV's are used in off-highway situations. Based on the percentages reported by Sylvester and the vehicle registration information presented in Table 3.5, the following table was developed (Table 3.6).

Table 3.6 Estimated Number of Vehicles Used Off-Highway

	<i>Montana</i>		<i>North Dakota</i>			<i>South Dakota</i>		
<i>Year</i>	<i>Trucks</i>	<i>ATV's & Motorcycles</i>	<i>Trucks</i>	<i>Motorcycles</i>	<i>ATV's</i>	<i>Trucks</i>	<i>Motorcycles</i>	<i>ATV's</i>
1990	24,162	7,399	15,377	1,810	2,414	18,420	2,135	2,863
1991	23,930	8,404	15,179	1,721	2,054	18,380	2,172	3,134
1992	24,706	10,020	15,295	1,623	2,568	19,054	2,105	2,998
1993	26,193	11,729	15,574	1,575	2,651	19,779	2,356	3,542
1994	26,584	13,165	15,961	1,532	3,468	20,448	2,324	NA
1995	26,919	14,072	16,106	1,470	3,375	20,786	2,264	3,735
1996	26,941	15,352	16,247	1,416	4,219	20,912	2,223	3,749
1997	27,308	16,898	16,290	1,379	3,894	21,368	2,210	4,417
1998	27,423	18,953	16,419	1,383	4,920	NA	NA	4,484

NA denotes data is not available.

For Montana, the estimated number of trucks used in off-highway applications increased from 24,162 to 27,423 during the years 1990 to 1998. The ATV and motorcycle group increased from 7,399 in 1990 to 18,953 in 1998. (Note: The ATV and motorcycle information used was compiled by Montana Fish, Wildlife and Parks using Montana Department of Justice, Title and Registration Bureau data (Walker 1999). The motorcycle and ATV information was adjusted to reflect off-highway use by Montana Fish, Wildlife and Parks and does not need further adjustment using the percentages reported by Sylvester (1995).)

In North Dakota, the estimated number of trucks used off highway increased from 15,377 in 1990 to 16,419 in 1998. The number of motorcycles used off highway decreased by approximately 500 motorcycles. Estimated ATV's used off highway showed a steady increase from 1990 to 1998. By 1998, the estimated ATV's used off highway had increased to 4,920.

In South Dakota, trucks used off highway increased from 18,420 in 1990 to 21,368 in 1997. Estimated motorcycles used off highway showed an increase of only 75 vehicles during the eight-year time period. ATV's estimated to be used off highway increased by 1,621 vehicles.

ENVIRONMENTAL CONSEQUENCES

The effects of the alternatives were analyzed for Montana, North Dakota and South Dakota. All counties for each state were included in the impact analysis, even though some of the counties may not contain FS or BLM land.

Economic impacts were estimated at the state level by vehicle type. Two vehicle types were analyzed: In one group were off-highway motorcycles and ATV's and in the other group trucks used in off-highway applications. Economic impact results will be presented for the No Action Alternative and for the action Alternatives 1 through 5.

This section will present projected number of vehicles, the economic impact model, and results.

Projected Number of Vehicles

Figures 3.3 through 3.5 display the actual and projected numbers of motorcycles, ATV's and trucks used in off-highway applications. The projected number of vehicles was estimated based upon the relationship between the number of registered vehicles and population. Overall, there is an upward trend in the total numbers of motor-

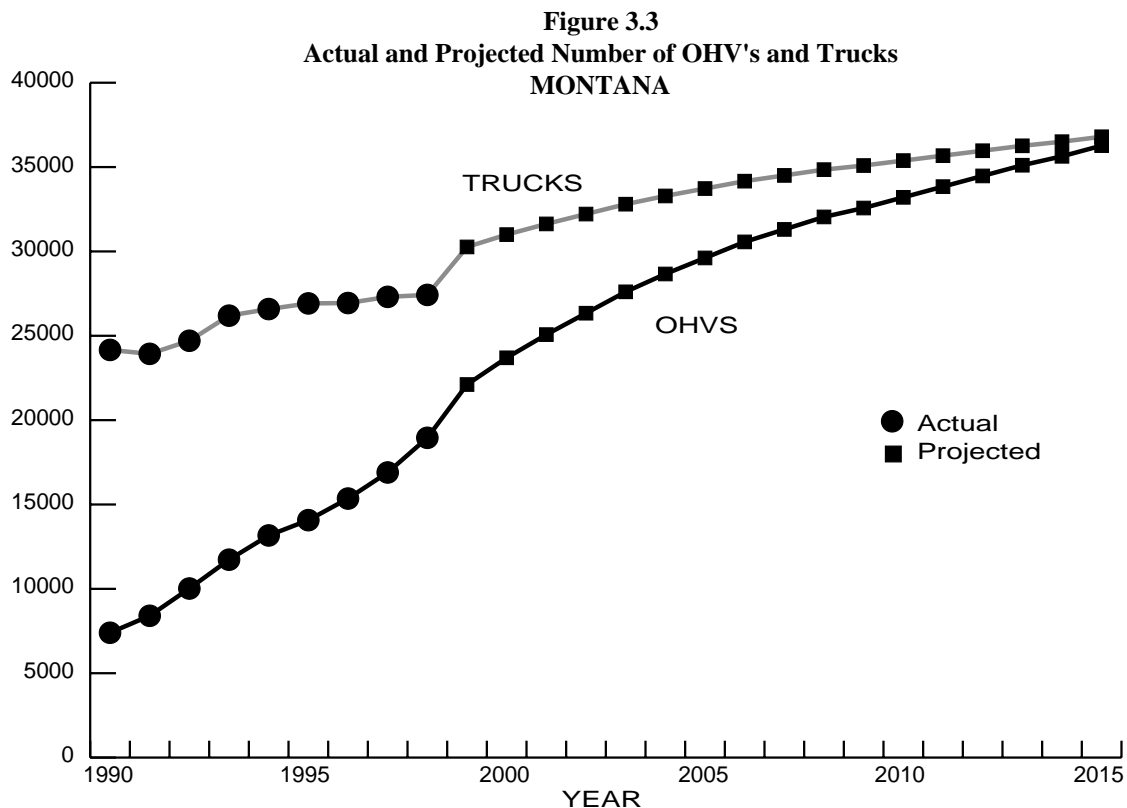


Figure 3.4
Actual and Projected Number of OHV's and Trucks
NORTH DAKOTA

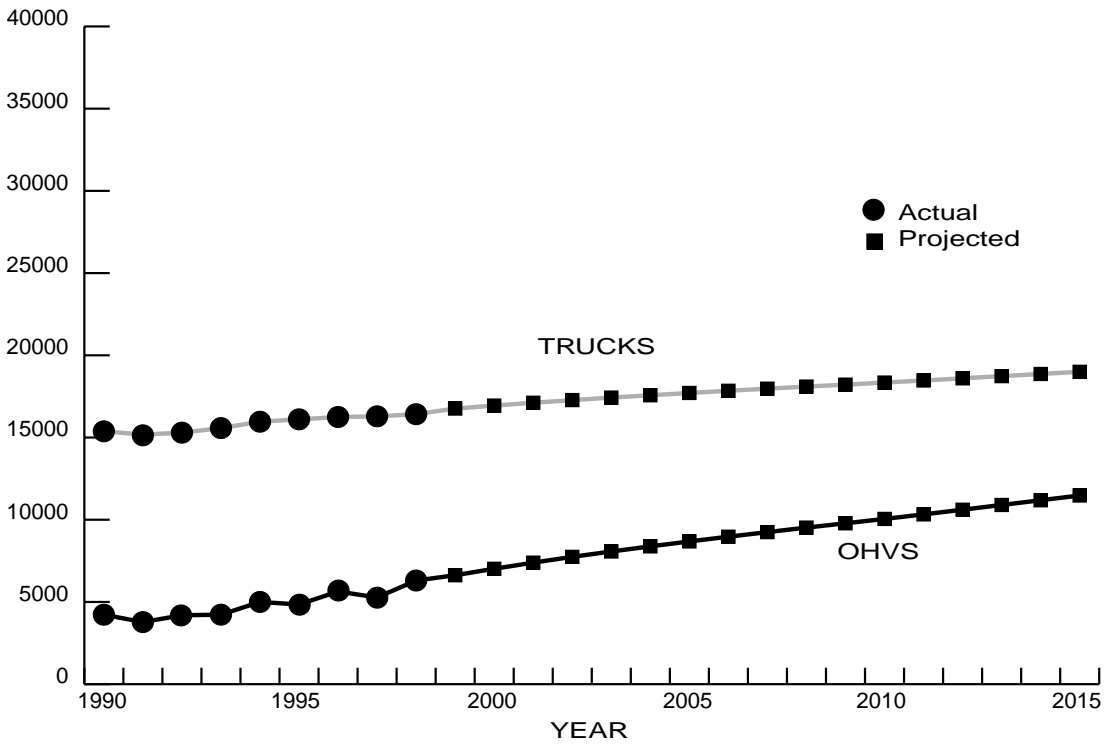
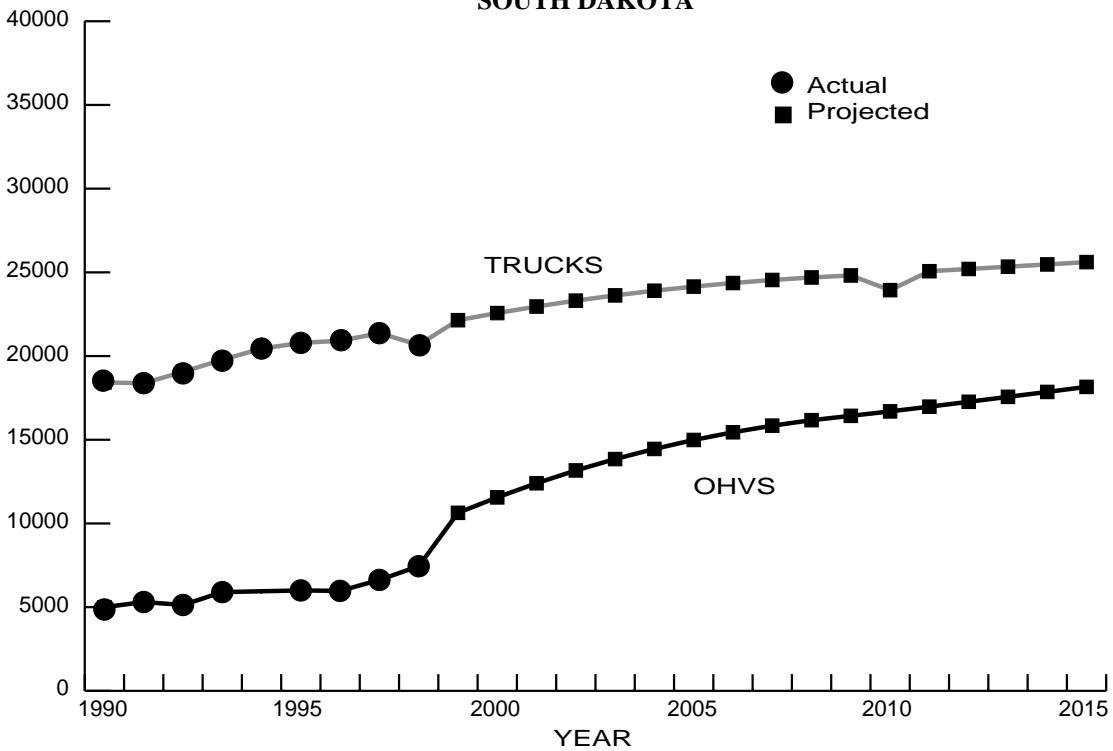


Figure 3.5
Actual and Projected Number of OHV's and Trucks
SOUTH DAKOTA



cycles, ATV's and trucks in the three states. Between the years 2000 and 2015, the three states will experience population increases according to the U.S. Bureau of the Census (USDC 1998b). Since the projections are based on population, an upward trend in motorcycles, ATV's and trucks is expected. A separate study also estimated increased off-road driving for the Rocky Mountain area (Cordell and others 1999).

In order to estimate economic effects, we need to have an approximate estimate of the number of motorcycles, ATV's and trucks that would be affected by this proposal. Since quantifiable data is lacking for actual use numbers, we need to take existing information that is available (number of registered vehicles from State vehicle registration bureaus and past research, Sylvester 1995), and make specific assumptions based on field observations to derive information that is lacking. Specifically, we need to make assumptions concerning the percentage of registered vehicles that are used in cross-country travel, how many might discontinue using their vehicles in the three-state area because of this proposal, and percentage of vehicles used in off-highway activities in North and South Dakota by using Sylvester's (1995) study.

This is a very broad analysis, and the estimated number of jobs and associated income are approximations. However, this approach will allow us to view the possible relative effects of this proposal.

Economic Impact Model

Input-output analysis was used to estimate employment and income effects. Input-output analysis is basically an accounting system that describes dollar or volume flows of commodities between all sectors of an economy. IMPLAN Pro, an input-output modeling system, was used to estimate input-output models for each state using 1995 economic data, the most recent IMPLAN data available (Minnesota IMPLAN Group, Inc. 1997).

No Action Alternative

The No Action Alternative assumes that there would be no effect on vehicles used in off-highway applications. The projected number of vehicles for the years 2005 and 2015 are displayed in Table 3.7. The jobs and employee compensation impacts shown in Table 3.8 are for the years 2005 and

Table 3.7 Projected Number of OHV's and Trucks for the Years 2005 and 2015

<i>Vehicle Type</i>	<i>Montana</i>		<i>North Dakota</i>		<i>South Dakota</i>	
	<i>Year 2005</i>	<i>Year 2015</i>	<i>Year 2005</i>	<i>Year 2015</i>	<i>Year 2005</i>	<i>Year 2015</i>
OHV's	24,597	36,249	8,927	11,718	14,976	18,145
Trucks	33,727	36,797	17,710	18,998	24,149	25,612

Table 3.8 Employment and Income Impacts for No Action Alternative

<i>State Affected</i>	<i>Vehicle Type</i>	<i>No Action</i>			
		<i>Year 2005</i>		<i>Year 2015</i>	
		<i>Jobs</i>	<i>Emp. Comp.</i>	<i>Jobs</i>	<i>Emp. Comp.</i>
Montana	OHV's	1,110	\$15,615,000	1,350	\$19,125,000
	Trucks	1,250	\$17,794,000	1,370	\$19,414,000
	Total	2,350	\$33,409,000	2,710	\$38,539,000
North Dakota	OHV's	320	\$ 4,703,000	420	\$ 6,173,000
	Trucks	640	\$ 9,329,000	680	\$10,008,000
	Total	960	\$14,032,000	1,100	\$16,181,000
South Dakota	OHV's	680	\$ 8,114,000	820	\$ 9,830,000
	Trucks	1,090	\$13,083,000	1,160	\$13,876,000
	Total	1,770	\$21,197,000	1,980	\$23,706,000

Note: The OHV category consists of off-road motorcycles and ATV's.

2015. The number of jobs and level of employee compensation includes the direct, indirect and induced impacts that result from the number of vehicles used in off-highway applications in the three states.

In the year 2005, there would be approximately 960 jobs in North Dakota attributable to off-road motorcycles, ATV's and trucks, with approximately \$14 million in employee compensation. In South Dakota, there would be approximately 1,770 jobs and \$21 million in employee compensation attributable to off-road motorcycles, ATV's and trucks. Off-road motorcycles, ATV's and trucks would have the largest influence in Montana, with approximately 2,350 jobs and \$33.4 million in employee compensation.

In the year 2015, the jobs and employee compensation effects will have increased due to the projected increases in off-road motorcycles, ATV's and trucks. An estimated 1,100 jobs in North Dakota, 1,980 jobs in South Dakota, and 2,700 jobs in Montana would be attributable to off-road motorcycles, ATV's and trucks. Employee compensation would be approximately \$16 million in North Dakota, \$23.7 million in South Dakota, and \$38.5 million in Montana.

Alternative 1

Alternative 1 assumes the worst-case scenario, that people would leave the sport because they would no longer travel cross-country with a motorized wheeled vehicle. If we assume 1% of the vehicles would no longer be used in the three-state area, the estimated effects are shown in Table

3.9. (Note: It is important to realize that the results in Table 3.9 can be adjusted to reflect whatever assumed vehicle displacement is desired. If it is assumed that 10% of the vehicles would no longer be used, then the results in Table 3.9 are simply multiplied by 10).

Using the same assumptions, projections for the year 2005 indicate that a reduction of approximately 9 jobs in North Dakota, 18 jobs in South Dakota, and 24 jobs in Montana would occur. Employee compensation would be reduced by approximately \$140,000 in North Dakota, \$212,000 in South Dakota, and \$344,000 in Montana. The employment and income reductions occur in sectors of the economy, such as hotel and lodging, restaurants, and gas stations, as well as others (see Table 3.4 for the OHV expenditure profile).

In the year 2015, the estimated jobs and employee compensation effects are displayed in Table 3.9. In North Dakota, the job reduction due to the assumed 1% decrease is approximately 11 jobs. The corresponding reduction in employee compensation in North Dakota is approximately \$162,000. In South Dakota, the job loss is estimated to be 20 jobs, with employee compensation reductions of approximately of \$237,000. In Montana, the job loss is approximately 27 jobs, with employee compensation reductions of approximately \$386,000. Once again, employment and income reductions occur in economic sectors, such as the hotel and lodging sector, restaurants, and gas stations, as well as others (see Table 3.3 for the OHV expenditure profile).

**Table 3.9 Change in OHV and Truck-Related Employment and Income Impacts
Between No Action Alternative and Alternative 1**

State Affected	Vehicle Type	No Action			
		Year 2005		Year 2015	
		Jobs	Emp. Comp.	Jobs	Emp. Comp.
Montana	OHV's	-11	-\$156,000	-13	-\$191,000
	Trucks	-13	-\$178,000	-14	-\$194,000
	Total	-24	-\$344,000	-27	-\$386,000
North Dakota	OHV's	-3	-\$ 47,000	-4	-\$ 62,000
	Trucks	-6	-\$ 93,000	-7	-\$100,000
	Total	-9	-\$140,000	-11	-\$162,000
South Dakota	OHV's	-7	-\$ 81,000	-8	-\$ 98,000
	Trucks	-11	-\$131,000	-12	-\$139,000
	Total	-18	\$212,000	-20	-\$237,000

This alternative could possibly increase administrative costs to the permittee and lessee by requiring them to obtain authorization. If authorization is denied, the permittee will not be allowed to use a motorized wheeled vehicle for cross-country travel, possibly leading to higher operational costs.

Alternatives 2 through 5

The following scale illustrates the relative economic effects of the various alternatives. The scale indicates that Alternative 1 is the most restrictive alternative from an economic aspect, and the No Action alternative is the least restrictive. Quantitative effects for Alternative 1 and the No Action is provided in Table 3.9. Alternatives 2 through 5 are discussed in relative terms using the scale shown in Figure 3.6.

Alternative 2 could potentially have negative impacts on employment and income, since game retrieval is only open on part of the Custer National Forest and on certain BLM lands in central and eastern Montana. However, the employment and income impacts are not expected to be as large as those estimated for Alternatives 1 and 5.

Alternative 3 keeps the Kootenai, Flathead, and Bitterroot National Forests open to all OHV use. This alternative is not as restrictive as Alternatives 1, 2, and 5. The economic effects are expected to be less than those for Alternatives 1, 2, and 5, but greater than those expected from Alternative 4.

Alternative 4 would have economic effects more closely resembling the No Action alternative, since the use restriction is only seasonal. There may be minor reductions in employment and income attributable to this alternative, but the reductions are not expected to be as large as the possible effects attributable to Alternatives 1, 2, 3 or 5.

Alternative 5 would have economic effects more closely resembling the estimated effects for Alternative 1.

Cumulative Effects

Vehicle registration information indicates that ownership of off-road motorcycles, ATV's and trucks has substantially increased during the past decade. This trend is ex-

pected to continue given the expected population growth projected by the U.S. Census Bureau. With the expectation of increasing use, the potential for motorized wheeled cross-country travel in the future would continue to grow.

CULTURAL RESOURCES

AFFECTED ENVIRONMENT

Introduction

Cultural resources is a broad term that refers to cultural properties and traditional lifeway values. A cultural property may be the physical remains of archaeological, historic or architectural sites and/or a place of traditional cultural use. Traditional lifeway value refers to the connection between the landscape and a group's traditional beliefs, religion or cultural practice. Because these resources are nonrenewable and easily damaged, laws and regulations exist to help protect them.

The National Historic Preservation Act (NHPA) and its implementing regulations require that federal agencies consider the effects of their undertakings on historic properties. The term historic properties refers to cultural properties that have been determined eligible for the National Register of Historic Places (NRHP). Federal agencies must consider American Indian traditional use, belief system, religious practices and lifeway values as directed by the Archeological Resources Protection Act of 1979 (ARPA), the NHPA, the Native American Graves Protection and Repatriation Act (NAGPRA) and the American Indian Religious Freedom Act (AIRFA). Traditional American Indian cultural properties and natural features are potentially eligible to the NRHP. Contemporary use sites for traditional or cultural purposes are provided protection under AIRFA. Additionally, rights reserved under treaties may possess an inherent measure of resource protection.

Federal agencies consider the effects of their management activities on historic properties by first conducting a field survey to locate cultural properties. As a result of these inventories, over 26,000 cultural properties have been recorded on public lands administered by the BLM and FS

Figure 3.6
Relative Economic Effects of Alternatives



in Montana, North Dakota and South Dakota. Of these, 2,323 were originally considered eligible for nomination to the National Register and 358 are actually listed on the Register. The remainder have either been determined not eligible or have not been evaluated.

The over 26,000 cultural properties occur on various landscapes and within all ecosystems represented in the analysis area, from the high alpine tundra and deep mountain forests of western Montana to the vast open grassland prairie and arid badlands of North Dakota and South Dakota. Site types range from prehistoric sites such as campsites, stone rings, quarries, eagle trapping lodges, and bison jumps to historic sites such as mining towns, homesteads, trading posts, military forts, and battlefields. Connecting these sites and environments are a network of historic and ancient Indian trails, explorer passages, military routes, railroad beds, and wagon roads.

General Prehistoric and Historic Occupation

Information accumulated to date demonstrates the long and diverse series of human occupation that spans at least the last 15,000 years. Tribal groups known to use the analysis area prehistorically, historically, and currently include three affiliated tribes (Mandan, Hidatsa, and Arikara), Northern Cheyenne, Standing Rock Sioux, Assiniboine, Arapaho, Blackfoot, Crow, Oglala Sioux, Cheyenne River Sioux, Rosebud Sioux, Santee Sioux, Turtle Lake Chippewa, Chippewa-Cree, Salish, Kootenai, Pend d'Oreilles, Kalispel, Shoshone, Bannock, Gros Ventre and Kiowa Tribes.

Contact with European cultures altered the human occupation with the influx of European diseases, assimilation efforts, and the resultant change in tribal cultural integrity with the onset of the reservation system. As non-Native Americans settled the area, they focused on occupations such as fur trapping and trading, mining, logging, ranching, homesteading and farming. Land ownership patterns developed over time, including the development of the FS and the BLM. Remnants of all these activities and events, both historic and prehistoric, can be found throughout the analysis area.

Existing Impacts of OHV Use

With the popularity of OHV use beginning just after World War Two and the availability of new, more versatile ATV's in the 1980's, access to more remote areas of public lands is possible. This new wave of motorized use has introduced more human presence in these remote areas and has left a mark on the landscape through the creation of introduced sounds, dust, smells, visual intrusions, and the creation of roads and trails through repeated use.

OHV impacts to cultural resources and or traditional use areas have occurred on the Kootenai, Beaverhead-Deerlodge, Gallatin and Lewis and Clark National Forests, Dillon Field Office, and Dakota Prairie National Grasslands. These impacts to the archaeological record include artifact crushing and breakage, erosion, soil compaction, and loss of ground cover. Introduction of audio, scent, and visual effects have altered some of the traditional use areas. Expanded access to remote areas has increased vandalism of the cultural resource and general degradation of the historic and natural landscape.

The nature of terrain and landscape crossed by OHV's is relative to both the type and number of sites impacted by this activity, and the type of effect the sites experience. For the Rocky Mountain Region, the mountainous terrain was as difficult to traverse for prehistoric and historic groups as it is for OHV users today. Traffic is concentrated along the corridors that often follow streams and rivers, the same areas of high probability for cultural site locations. Rutting and erosion of the sites located along these corridors has impacted sites in the Beaverhead-Deerlodge National Forest. In the Whitetail-Pipestone area, OHV users have created a spiderweb network of trails that crisscross highly erosive granitic soils. This motorized wheeled cross-country travel has affected cultural sites and other resources to such an extent that the BLM and FS instituted an emergency area closure in the spring of 1998.

Mining towns clinging to the steep slopes of the mountains were accessed in the past by trails and roads used by OHV's today. This access has encouraged the pioneering of new trails to the more remote features of these ghost towns and has contributed to increased site collection and vandalism of historic trash dumps and buildings on the Lewis and Clark National Forest (R. Newton, pers. comm. 1999). This use of OHV's, especially ATV's, allows people to cover more ground off roads and trails and has increased exposure of the more remote cultural sites to vandalism and illicit collecting.

Substantial impact to cultural sites from motorized wheeled cross-country travel has been observed during the last twelve years along the drawdown zone of Lake Koocanusa on the Middle Kootenai River Archaeological District on the Kootenai National Forest. Archaeological monitoring of the sites from 1985 to 1993 revealed that 10% of the site within the district displayed damage from OHV use, with 777 incidents observed over the eight-year monitoring period. Two types of damage were recorded: illegal collecting and physical impacts from OHV travel across the sites. In numerous cases, both types of impacts were observed, with several sites exhibiting numerous/multiple incidents. These cultural sites are also greatly valued by the Confederated Salish and Kootenai as vestiges of their heritage, and

the entire Lake Koocanusa is considered an area of high cultural sensitivity (Timmons 1999). Site-specific analysis of the drawdown zone of Lake Koocanusa is currently being addressed in the Rexford District Recreation Management Plan and is not part of the affected environment.

Trails are not necessary for travel upon the alpine plateaus of the Big Snowies on the Lewis and Clark National Forest. In one instance, people observed motorcycle use across cultural sites, which was later reported to the FS by several people when they were hiking in the Big Snowy Wilderness Study Area. These same qualities were also sought by American Indians in the past who walked to these high plateaus, possibly seeking sacred places for spiritual guidance and leaving behind the cultural sites we record today. These sites, as well as traditional use areas, are easily damaged by OHV crossing, rutting, and subsequent erosion.

The Crow have long been concerned about the lack of respect many recreationists, particularly snowmobile users and OHV users, in the Crazy Mountains on the Gallatin and Lewis and Clark National Forests (Burton Pretty On Top, pers. comm. 1999). The mountains are considered especially sacred to the Crow and contain numerous religious and burial sites. Access from motorized wheeled cross-country travel has interrupted the silence needed for traditional use practices and, in addition to the fumes and erosion, displays a lack of respect for this sacred area.

For the Northern Plains areas, the higher use and easy accessibility is evident by the greater number of sites found east of the Rockies. Bison kill sites, processing areas, campsites, tepee rings, and historic trails are a few of the numerous types of sites recorded in these open, rolling prairies easily accessed by OHV's. Quick and easy access to these locations has resulted in increased illicit collection, rutting, and erosion of many of these sites previously inaccessible except by foot or horse.

Proven to be an attraction for OHV users are the isolated buttes and badlands of North Dakota and South Dakota. The Blue Buttes, located on the Dakota Prairie National Grasslands, are considered sacred to the Low Hat Clan of the Hidatsa and have been damaged to some degree by OHV use. The Hidatsa have used these buttes for hundreds of years as a fasting area where the qualities of remoteness, quiet and solitude are necessary for their traditional use activities. Four-wheel drive trucks have recently been used to try and climb Chimney Butte, introducing noise and exhaust fumes into the area and leaving behind ruts and scars on the landscape (M. Floodman, pers. comm. 1999).

In the badlands, ATV and motorcycle tracks have been found along the Custer/Sully Trail. Ruts from the wagons

accompanying Custer on his ill-fated trip to the Battle of the Little Bighorn in 1876 are still visible in the badlands and are threatened by increased OHV use of this area.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Prehistoric and historic cultural resources are a nonrenewable resource. Significant cultural resources have many values, including their use to gather scientific information on human culture, history, interpretive and educational value, values associated with important people and events of significance in our history, and often aesthetic value, as in a prehistoric rock art panel or an historic landscape. OHV use on public lands is one of many land use activities that have disturbed cultural resources within the analysis area.

Since the 1960's when recreational OHV's began to increase in popularity, there have been several studies conducted that documented the impacts of OHV use on the environment and, particularly, archaeological sites (USACOE 1992, Lyneis, Weide and Warren 1981). These impacts can be described as direct and indirect. Direct impacts include the crushing, breaking, and scattering of cultural material when OHV's are driven through and across a site, soil compaction from vehicle wheel pressure, and the intensification of soil erosion processes by the removal of protective ground cover, such as vegetation and natural clutter, especially when ruts and trails are formed from repeated crossings. Much of this may happen without the OHV user even being aware of the damage. Many of the significant prehistoric sites found in Montana, North Dakota and South Dakota are very shallowly buried, with subsurface cultural material occurring as little as 30 to 40 cm below the present ground surface (M. Ryan, pers. comm. 1999). These sites are particularly vulnerable to disturbance from OHV-caused ruts and trails.

Of particular concern are archeological sites that are crossed by OHV user-created roads and trails. Most designed and planned roads and trails constructed since 1979 have been subject to compliance with the various historic preservation laws. OHV user-created roads and trails, on the other hand, have not been reviewed and the locations are often based on convenience, short cuts and/or challenge. As a result, these OHV user-created tracks have begun to show up on archaeological sites in all parts of the analysis area, and continued use of these roads and trails may continue to damage cultural resources. However, the agencies do have the authority to close a specific road, trail or area that has considerable adverse cultural effects (36 CFR 295.5 and 43 CFR 8342).

Indirect impacts include the use of OHV's to access, and then loot or destroy archaeological sites. This form of destruction, which includes artifact collecting and souvenir hunting, is considered vandalism and is intentional. Few prehistoric or historic resources are in themselves portable, for these cultural resources are rarely just the objects. The resource is the information contained in the cultural property, and the removal of objects from their original surrounding generally destroys that information. Illicit collection, such as souvenir and artifact collecting, and vandalism reduces the information to just the object - stone tools, arrowheads, glass bottles, etc. in a drawer, can or pocket. OHV use by vandals also allows quick, often undetected collection of the information/object and, to a larger degree, artifacts too heavy to transport by foot can now be transported by OHV and for much longer distances.

The incidence of vandalism and illicit collection is also very much influenced by the level of visitation and access to certain areas. Greater visitor use to some areas has led to the increase of vandalism, illicit collection, littering and disturbance to cultural sites. Vandalism has also increased in previously inaccessible areas, due in part to the fact that many visitors now use OHV's that are capable of reaching these formerly isolated areas. Vandalism of rock art panels has increased considerably over the last twenty years on the Custer National Forest, which may be due in part to the increased availability of OHV's that can access these remote areas. While cultural properties situated along designated trails and road corridors can be signed, monitored, patrolled and protected, the impacts outside of these areas are largely uncontrolled and the extent of impact unknown.

Increased accessibility and visitation are also important criteria for evaluating the potential for destruction or vandalism of the traditional cultural, natural and historic landscapes. Most contemporary use, before the advent of OHV's, seemed to be limited to roads and trails and their immediate environs. Comparatively inaccessible sites were naturally protected from direct and indirect impacts. These previously inaccessible areas, often sought for their remoteness, solitude, and pristine qualities, have been directly affected by the introduction of motorized sounds, dust, smells, and user-created roads and trails. Expanded access and increased visitation may impede some Indian groups in the practice of their traditional cultural use.

No Action Alternative

The use of a variety of OHV's has been a key factor in the increased recreational use of public lands over the last thirty years and the incremental increase of direct and indirect impacts to the cultural resource. Continued development of user-created trails would increase the likelihood that more unrecorded and recorded sites would be damaged. Isolated

cultural resources would continue to be more and more accessible as OHV technology improves, and thus become more vulnerable to direct impacts.

North Dakota, South Dakota and eastern Montana are highly accessible, either as a result of roads and trails or gentle topography. A substantial portion of the cultural resources in these areas must be considered unprotected from user-created roads and trails, and vandalism. This alternative does not offer any means (except emergency closures) of reducing that access, and current degradation of the heritage resources as a result of OHV traffic would continue. Impacts would continue to known and unknown sites by further creation of user-created roads and trails.

Cultural resources along Delmoe Lake on the Beaverhead-Deerlodge National Forest would continue to suffer damage as increased and cumulative use of these areas takes its toll on the cultural resource. Cultural resources located along the mountain corridors and on shallow soils would continue to be degraded from OHV traffic.

Traditional Native American use areas in the Blue Buttes and the Crazy Mountains would continue to be affected by the introduction of noise, dust, fumes, visual impacts, and increased access/visitation.

Alternative 1

If motorized wheeled cross-country travel is restricted yearlong, any new direct damage to heritage resources from motorized wheeled cross-country travel should be minimized. There should be no increase in new user-created trails or roads that may damage sites.

Prohibiting motorized wheeled cross-country travel could protect sites from vandalism where OHV's are used for access. If restrictions to roads and trails leave substantial, contiguous portions of public lands isolated from motorized travel, the agencies would expect vandalism to diminish, for accessibility is one of the major factors in the rate of vandalism. This would restore some areas and landscapes to former remoteness and protect the natural solitude, isolation and quiet necessary for the continuation of traditional cultural practices.

Alternatives 2 and 5

These alternatives would essentially have the same effects to cultural resources as Alternative 1. The exception for camping 300 feet from the road would provide less protection to the cultural resources than Alternative 1. In Alternative 2, game retrieval should not, in most instances, affect the cultural resources.

Alternative 3

Restricting use to certain areas does confer some protection of the cultural resource in those areas, similar to Alternatives 1 and 2, if the network of roads and trails does not increase or expand. There is reason to believe that the network of roads and trails would continue to increase in areas classed as less restrictive, and that currently recorded sites and previously inaccessible sites would continue to suffer from OHV damage.

Directing OHV use from one area to another, while protecting some areas, may displace the impacts to those areas not subject to the restriction. While restricting use in the prairie areas and in eastern Montana mountainous areas, which may actually be easier to “heal” due to topography and climate, OHV users may shift their use to the mountainous areas in western Montana where damage may be long-term. In addition, the more mountainous areas contain cultural sites concentrated along the very corridors where OHV’s would be utilized more frequently. Increased visitation to these areas may also increase the incidence of vandalism in these areas. For this alternative, fragile areas along the lakes, river and stream corridors may be subjected to more vandalism. By limiting access in all but the western forests, this alternative offers some protection for traditional cultural areas, such as in the Crazy Mountains and Blue Buttes.

Alternative 4

Restricting use seasonally would not provide any additional protection from direct or indirect effects of motorized wheeled cross-country travel on cultural resources. The amount of OHV damage that would occur to sites under this alternative is directly proportional to the amount of unrestricted use of OHV’s that continues and spreads to new areas. The network of roads and trails would continue to increase in these areas despite seasonal use restrictions, and new user-created trails would continue to be created, opening up new areas to OHV use. While there may be fewer ruts created by crossing sites during wet seasons and the effects may somewhat decrease with a decline in use, this alternative will have similar effects to cultural resources as the No Action Alternative.

Cumulative Effects

Cumulatively, the No Action Alternative would lessen the number and integrity of known and unknown sites within the analysis area. Over time, along with natural factors and management activities, fewer cultural resources would remain intact, and those remaining would continue to be degraded. Fewer and fewer areas appropriate and available for traditional cultural practices would remain.

Cumulatively under Alternative 1, as site-specific plans are developed, cultural resources along roads and trails would be inventoried and protected. Cultural resources located off these existing corridors would retain their relative site integrity. Few cultural resources would be degraded as a result of motorized wheeled cross-country travel.

Under Alternative 2 and Alternative 5, the cumulative effects would be the same as Alternative 1.

Cumulatively, Alternative 3 would lessen the number and integrity of known and unknown sites within the western forests and, along with natural factors and management activities, over time would lead to fewer intact cultural resources, and those remaining may continue to be degraded.

Under Alternative 4, the cumulative effects would be the same as the No Action Alternative.

Comparison of Alternatives

The No Action Alternative and Alternative 4 would cause the greatest direct and indirect impacts to the cultural resources in the analysis area. These alternatives would lessen the number and integrity of known and unknown sites within the analysis area and, along with natural factors and management activities, in time would lead to fewer undisturbed cultural resources. Fewer areas appropriate and available for traditional cultural practices would remain. Historic and natural landscapes would be degraded.

Alternative 3 would cause direct and indirect impacts to the cultural resources and historic natural and traditional use landscapes located on the Kootenai, Flathead, and Bitterroot National Forests but would protect, in part, those cultural resources, traditional values and landscapes in the eastern forests and grasslands.

Alternative 1, 2 and 5 offer the most protection for the cultural resources in the whole analysis area and ensure that places of importance for their natural and historic landscape and traditional use are preserved.

PALEONTOLOGICAL RESOURCES

AFFECTED ENVIRONMENT

Paleontological resources or fossils, are remains, traces, or imprints of plants and animals preserved in rocks. Fossils allow the interpretation of ancient environments and envi-

ronmental change and provide direct evidence of the origin and evolution of life.

Fossil-bearing strata in Montana, North Dakota and South Dakota are thousands to billions of years old, ranging from the more recent Holocene Epoch to the Precambrian Eon. During the Precambrian and early Paleozoic, life arose and diversified. More recently, life has undergone a series of extinctions and major reorganizations.

Public lands of Montana, North Dakota and South Dakota hold richly fossiliferous strata that chronicle the history of life in North America. A growing interest in the lifestyles and sudden demise of dinosaurs draws specialist and amateur collectors alike to Cretaceous outcrops of eastern Montana (Judith River area) and western South Dakota (Grand River area). Motorized wheeled cross-country travel, which poses a threat to fossiliferous outcrops, is not restricted in either area.

ENVIRONMENTAL CONSEQUENCES

No Action Alternative

Under this alternative, OHV operators would continue to have access to remote outcrops and collecting localities. These sites are vulnerable to destruction by off-road travel. Motorized wheeled cross-country travel allows vandalism of fossils that might otherwise be too heavy or awkward to pack out on foot.

Alternatives 1, 2, and 5

Under these alternatives, motorized wheeled cross-country travel would not be allowed. Potential collectors could not reach remote fossil locations with the use of OHV's. In addition, unintentional destruction of fossils by OHV enthusiasts would be minimized or prevented.

Alternative 3

Under this alternative, motorized wheeled cross-country travel would be restricted in the plains and prairies, which are the most sensitive areas for paleontological resources. Impacts would be comparable to Alternatives 1, 2, and 5. Although OHV use is permitted on the Kootenai, Flathead, and Bitterroot National Forests, such use is not expected to result in damage to or vandalism of paleontological resources because travel in these areas is limited by steep terrain and dense vegetation.

Alternative 4

Under this alternative, motorized wheeled cross-country travel is permitted during the dry season (June 15 through

August 31) and when the ground is snow-covered or frozen (December 2 through February 15). Impacts during the spring and summer would compare with the No Action Alternative (i.e., damage and vandalism may result from OHV use). Minimal impacts are expected when the ground is frozen and snow-covered.

Cumulative Effects

Cumulative effects would be greatest under the existing management condition, that is, under the No Action Alternative. All other alternatives would restrict access to remote paleontological sites and would reduce cumulative effects. Alternatives 1, 2 and 5 would provide the best protection (fewest cumulative impacts) for paleontological resources.

VEGETATION AND WEEDS

AFFECTED ENVIRONMENT

Vegetation

This section describes in more detail the characteristics of the three ecological regions discussed earlier in Chapter 3. These regions are the Rocky Mountain Region, the Great Plains Region, and the North American Prairie Region (Figure 3.1). In addition, this section describes invasive exotic weeds, native plant communities and threatened, endangered, and sensitive plants.

Ecological Regions

Rocky Mountain Region: The Rocky Mountain Region can be subdivided into three provinces. The first is the Northern Rockies Province, which is characterized by rugged mountains separated by flat valley bottoms. Elevational relief within this province ranges from 3,000 feet to over 9,000 feet. Temperatures can be severe, but are often moderated by coastal influences. Precipitation is generally greater than the rest of the Rocky Mountain Region and averages between 16-100 inches annually. Most of the moisture comes in the fall, winter, and spring. Summers are relatively dry.

Soils are less rocky than surrounding mountain provinces in the west and have a distinct volcanic influence. The excellent soil conditions and precipitation result in lush vegetation, which more closely resembles the Pacific Northwest. Prior to European settlement much of this area was almost entirely forested. There is very little land higher than timberline and no lower timberline is evident naturally, but has been created by conversion to agriculture and other land conversion efforts. Today, the most common forest types are Douglas-fir, grand-fir and cedar-hemlock. A lush cover

of ferns, forbs, and regenerating trees characterizes the forest understory.

The second province is the Middle Rockies. Elevations generally range from 3,000 feet to almost 11,000 feet. The BLM and FS lands are moderately steep to very steep mountains. The lower elevations include some gentler foothills. The climate is highly variable, depending on local elevation and aspect. In general, valleys are warmer and drier, with annual precipitation of 15-25 inches annually. Higher mountain ranges are cooler and precipitation is 70 inches or more annually, with 40-60% coming as snow.

The aridity and evaporation rates of the Middle Rockies sharply define forest and nonforest areas. Both upper and lower tree lines are common. Low and middle elevation forests on south and west facing slopes are dominated by sagebrush and semidesert conditions. The opposite aspects typically consist of Douglas-fir and ponderosa pine. Lodgepole pine is common throughout this region on a variety of aspects. At higher elevations, Engelmann spruce and sub-alpine fir are the most common species.

The third province is the Southern Rockies, which is confined to south-central Montana and the Yellowstone Plateau. Elevations range from 5,000 feet to 11,000 feet and more. The climate is highly variable and depends on local elevation and aspect. Valleys are generally warmer and drier, with annual precipitation of 15-25 inches. Higher mountain ranges are cooler and precipitation is 40 inches or more per year, with the majority coming as snow.

The flora of this region is highly variable. Constant changes in elevation and aspect results in a large-scale mosaic of conifer forests, hardwoods, and shrub/grasslands. Spruce and fir often dominate the highest elevation forests with lodgepole and aspen at middle elevations, and Douglas-fir in the lower forested zone. Other less common forest types include limber pine and whitebark pine.

Great Plains Region: Three provinces occur in this region. The Great Plains Province comprises most of eastern Montana and the western parts of North Dakota and South Dakota. It is characterized by rolling plains and tablelands and generally flat to moderate slopes. The badlands across the northern tier of central to eastern Montana and western North Dakota are exceptions. They range in elevation from below 2,000 feet to about 5,500 feet. Average annual precipitation ranges from 10-20 inches with 20-50% coming in the form of snow and the remainder as spring and summer thunderstorms. The vegetation is composed of a wide variety of grasses, forbs, small shrubs (sagebrush and rabbitbrush) and sometimes a few scattered trees. The lack of forested environments is due to the rain shadow effect of the Rocky Mountain Range to the west.

The Intermountain Semidesert Province covers a very small portion of south-central Montana just east of Yellowstone National Park. Elevations range from 3,700 and 4,700 feet. It is comprised of dissected plains, terraces and fans formed in shale, siltstone and sandstone overlain by some alluvium and lacustrine sediment. Annual precipitation ranges from 5-12 inches per year. The vegetation is composed primarily of sagebrush steppe and some foothills prairie.

The third province is the Great Plains Steppe. It covers the eastern portions of North Dakota and South Dakota except for an eastern strip. It has very little topographical relief that ranges from 1,000 to 2,000 feet in elevation. It is characterized by flat and rolling plains formed from glacial drifts and outwash plains, except of the Missouri River where there are loess and sand deposits. Annual precipitation is between 15-20 inches, with 30-40% coming in the winter as snow. Drought is less frequent and severe than further west. Short and tall grass species comprise the vegetation. Woody vegetation is rare except for cottonwoods in the floodplains.

North American Prairie Region is the same as described earlier in Chapter 3.

Invasive Exotic Weeds

The invasion of native plant communities by exotic plant species is a threat nationwide with ecological and economic consequences (National Strategy for Invasive Plant Management). Weeds are spread many ways: animals (livestock, birds, or other wildlife), pets, people hiking, bicycling, and all forms of motorized equipment, movement down streams, wind, etc. Each weed has its own unique characteristics that make seed transport by some methods more significant than others. The concern with OHV's is their potential to spread weed seed. OHV's can get weed



Knapweed along a road in western Montana.

seed temporarily attached to them and then drop the seed in an area without weeds. One study, under experimental conditions with a pickup truck, determined that an average of 1,644 knapweed seeds were caught on the vehicle after backing 40 feet through an infested patch and then pulling back out. After driving one mile, 226 seeds or 14% were attached, and after ten miles, 138 seeds or 8% were still attached (Trunkle and Fay 1991). This type of seed attachment and dispersal would occur only when plants are mature and the seeds are ripe. Sometimes, after the continued and heavy use of OHV's in a concentrated area, such as a trail, vegetation is reduced and the soil exposed, which creates favorable conditions for weeds to become established.

A review of weed inventory maps demonstrates the strong association of weeds with roads and trails. This is related to the common use by people and animals that transport the seeds. In addition, these areas are kept perpetually disturbed through use. These roads and trails serve as the invasion corridors for many weeds, which then spread away from those locations. Due to the random nature of motorized wheeled cross-country travel, the spread of weeds to new locations is not easily detected. The impact of exotic invasive plants is tremendous on native plant communities, wildlife populations and habitats, and economics (Duncan 1997). The economic impacts of weeds are considerable, affecting livestock and crop production, reduced recreation opportunities and reduced wildlife related expenditures. One study indicated a total economic loss of \$42 million in direct and secondary economic impacts from knapweed in Montana. Direct losses for grazing were \$11 million and \$3 million on wildlands. A study of the losses from leafy spurge in Montana, Wyoming, North Dakota and South Dakota indicated losses of approximately \$120 million related to grazing and \$10 million related to wildlands. All these effects and more are summarized in Duncan's (1997) paper on the benefits of weed management.

The term "noxious weed" has a specific recognized legal meaning compared to "invasive" plant. A noxious weed is an exotic plant designated at the federal, state or county level, that if established or introduced, may render lands unfit for agriculture, forestry, livestock, wildlife or other beneficial uses. When so designated, property owners/managers have a legal responsibility to prevent the propagation and spread of that weed or manage it in accordance with a weed management plan. Many plants can be invasive but are not legally designated as noxious, thus the term invasive exotic is often used as a broader, more inclusive term, referring to problematic plants.

An estimated 930,000 acres or 5.1% of FS lands are infested with noxious weeds in Montana, North Dakota and South Dakota. BLM has an estimated 390,000 acres, or 4.5%, of

infestation on public lands. BLM acreage with noxious weeds increased fourfold between 1985 and 1996. Many of these weeds were introduced and identified in the 1950's or earlier. Most of the knowledge for type and distribution of weeds is due to recent inventory efforts made possible by global positioning technology and computer mapping. Also, experience and studies have shown that in areas of infestation noxious weeds increase about 14% a year under "natural" conditions (USDI 1985, USDI 1991a, USDI 1996). This demonstrates the rapid pace of the noxious weed invasion. The figures also indicate that a lot of land has not yet been infested. The weed infested acreage figures are dominated by a few weed species. Spotted knapweed, leafy spurge and St. John's wort account for 91% of the acreage, spotted knapweed accounts for 79% by itself, on FS lands. Another 55+ species account for the remaining acreage. The weeds are not evenly distributed across all lands. On FS lands, 87% of the acres infested are on the four western forests, the Kootenai, Flathead, Lolo and Bitterroot. Leafy spurge is the most common weed on public lands in the Prairie Region and the eastern portion of the Great Plains Region.

A number of the species that have relatively few acres infested have the potential to be as problematic as spotted knapweed and leafy spurge; however, through current prevention, detection and control efforts they have been limited to the current infestation levels. An example has been the management of rush skeleton weed in a cooperative effort between Lincoln and Sanders Counties, the Kootenai National Forest and Montana Department of Agriculture. The weed has been identified and treated at the level of numerous small spots, all less than a few acres, for many years now. The amount of time and money expended to keep rush skeleton weed contained is very high on a per acre basis, but it is protecting millions of acres of agricultural and wildlands from infestation. Prevention is the cheapest method of managing invasive exotics.

The FS and BLM have implemented a number of requirements as part of their prevention programs to minimize the spread of weeds by a wide range of activities. Requiring weed seed free forage for livestock used on NFS and BLM lands is one. Other practices include weed seed-free straw and seed mixes for erosion control and revegetation activities. Requiring the cleaning of equipment used off-road for logging, utility transmission work, special use permits, permittee equipment use, and fire fighting equipment are other preventive practices. OHV activity is but one of many human activities that has the potential to cause the spread of noxious weeds or invasive plants. Agencies and co-operators are continuing to develop best management practices to be used in all different forms of land management activities to prevent or reduce the risk of new weed infestations and contain or reduce the spread of existing ones.

Native Plant Communities

Native plant communities are displaced when repeated OHV use occurs in a location, whether this use is occurring in a riparian zone or upland area; however, the total amount of area affected is quite small considering the three-state area. It can have local site-specific ramifications, but they are beyond the scope of this decision. The removal of vegetation cover and root systems can lead to other resource damage such as soil erosion, sedimentation in streams, etc. These issues are discussed in the Aquatic and Soils sections.

Threatened and Endangered Plants

Water Howellia: This threatened plant species occurs as a submerged or floating annual associated with lakes and ponds. The surrounding upland vegetation is typically a dense conifer forest. Most of the 106 occurrences on record in Montana are on the Flathead National Forest, all in the Swan Valley (Lake and Missoula Counties). Some of these sites occur in limited access grizzly corridor zones behind locked gates where use is restricted by number of visits per week. The habitat of this plant is not conducive to OHV traffic, and no impacts from motorized wheeled cross-country travel are known or anticipated to occur.

Ute Ladies' Tresses: None of the 11 occurrences in Montana of this threatened plant species are on BLM or FS lands, though the Butte Field Office was involved in an interagency wetland project at one site that has been opened to hunting and other nonmotorized public use and was identified at one time as a possible land exchange. The habitat for this species includes meandered wetlands and swales in broad, open valleys at margins with calcareous carbonate accumulation. They are in a four-county area of the Jefferson River and confluent lower reaches of the Beaverhead, Gallatin, Madison and Ruby Rivers. Most Montana occurrences are on private land; a few are on State lands. Surveys for this species were conducted to delimit the range of distribution in Montana, including the most likely BLM and NFS lands, but this species was not found on BLM or NFS lands (B. Heidel, pers. comm. 2000). Therefore, the likelihood that this species occurs on BLM or NFS lands is low.

Western Prairie Fringed Orchid: There are three remaining large populations of this threatened species. One occurs within the analysis area on the Sheyenne National Grassland. This species is associated with sedge meadows, primarily within the tallgrass prairie. It occurs in the sandhills habitat association on the Sheyenne National Grassland. Across its range, the species is generally found in fire and grazing adapted grassland communities, most often on unplowed calcareous prairies and sedge meadows. It has

also been documented in successional plant communities on disturbed sites. (USDA 1999b).

Maintenance of functional, dynamic tallgrass prairie is key to survival of the species. Disturbances such as fire, flooding, and grazing occurred historically and may be important for orchid regeneration. Precipitation and flooding events on the Sheyenne National Grassland influence extinctions and recovery of local orchid populations. (USDA 1999b).

Spalding's Catchfly: Currently proposed as threatened, this species is known from a total of 52 populations distributed across Washington, Oregon, Idaho, Montana, and British Columbia. The habitat is primarily restricted to moist grasslands that make up the Palouse region in southeastern Washington, northwestern Montana and adjacent portions of British Columbia, Idaho and Oregon. Large-scale ecological changes in the Palouse region over the past several decades, including agricultural conversion, changes in fire frequency, and alterations of hydrology have resulted in the decline of Spalding's Catchfly. More than 98 percent of the original Palouse prairie habitat has been lost or modified by agricultural conversion, grazing, invasion of nonnative species, altered fire regimes, and urbanization. In northwest Montana, this open grassland habitat is one of the few habitats conducive to motorized wheeled cross-country travel.

Within the analysis area, none of the known populations of Spalding's catchfly occur on FS or BLM lands. However, potential habitat exists on the Kootenai, Flathead, and Lolo National Forests. One of the largest populations occurs in Eureka, Montana in close proximity to FS lands. Other populations in Montana also occur near NFS lands; therefore, the probability that this species occurs on NFS lands is moderate. Future surveys of potential habitat on FS and BLM lands will be needed to determine the extent of this species.

Some past surveys for this species have been conducted on the Kootenai and Flathead National Forests. On the Flathead National Forest, small isolated suitable habitats exist along the North Fork of the Flathead River floodplain from the Canadian border to Polebridge; in very small, isolated grasslands in the Swan Valley; and in larger open fescue bunchgrass prairies in the South Fork Flathead and Danaher Creek Drainages within the Bob Marshall Wilderness. These habitats do not comprise more than 1% of the land base of the Flathead National Forest and most have been surveyed for this species (M. Mantas, pers. comm. 2000). On the Kootenai National Forest, potential habitat exists in the Tobacco Valley area around Eureka, Montana where one of the largest known populations occurs. Some of the grazing allotments with suitable habitat have been surveyed for this species.

Sensitive Plants

For the FS, a sensitive plant species is one that has been designated by the Regional Forester because of concern for population viability, as evidenced by: 1) significant current or predicted downward trends in population numbers or density; and/or 2) significant current or predicted downward trends in habitat capability that would reduce an existing species distribution. For the BLM, sensitive plants must: 1) be proven to be rare by proper study(s); 2) be proven to be imperiled by proper study(s); and 3) be documented on BLM surface. Although sensitive species are not protected under the ESA, their conservation is required by FS policy (FS Manual 2670) and by BLM policy (Special Status Species Plants Policy). Currently, the BLM has 28 plant species designated as sensitive in Montana, North Dakota and South Dakota. The FS has 114 plant species designated as sensitive in Montana and 46 in North Dakota and South Dakota. The list of sensitive species is found in Appendix F. These species occupy a wide range of habitats that include, but are not limited to, open grasslands, shrublands, forested areas, wetlands, rock outcrops, riparian areas, and specific substrates such as bases of shrubs. Many of these habitats are currently available and vulnerable to motorized wheeled cross-country travel.

ENVIRONMENTAL CONSEQUENCES

Introduction

The effects from OHV activities on vegetation and invasive weeds are very closely related and are discussed together in this section. Weed management has many components, and motorized wheeled cross-country travel is only one small part of it. Other management practices are outside the scope of this proposal and are dealt with through environmental analyses associated with those activities.

Effects Common to All Alternatives

Weeds: OHV travel has had numerous direct and indirect effects in relation to invasive weeds. Under all alternatives, weed spread on roads and trails will continue to occur. Indirectly, the establishment of weeds leads to numerous impacts to other resources. While no attempt is made to describe all the possible effects of each weed species, the following represents examples of the potential effects of weeds on other resources that are indirectly attributed to spread by OHV's.

Introduction and establishment of weeds can displace native species and plant communities which results in loss of species diversity and a change in the structure of the plant

community (Tyser and Key 1988, Tyser 1992, Rice et. al. 1997a). These changes then lead to changes to wildlife habitat. However, the amount of area of native plant community directly affected by cross-country OHV use is quite small considering the whole analysis area and cannot be measured at the scale of this analysis.

Other examples include poisoning of livestock that consume weeds. Sediment yield and surface runoff can increase in areas infested with spotted knapweed (Lacey et al. 1989). Another example is the alteration of fire behavior as a result of weed species. Cheatgrass cures out very early and leads to more frequent burning. Leafy spurge contains oil compounds that are highly flammable.

Threatened and Endangered Plants: Under all alternatives, there would be no effect to the threatened water howellia due to a lack of known or anticipated impacts of motorized wheeled cross-country travel on this species and its habitat. Under all alternatives, there would be no effect to the threatened Ute ladies' tresses, as this species is not known to occur on NFS or BLM lands within Montana, although surveys of the most likely BLM and NFS lands were conducted for this species to delimit its range of distribution without detection (B. Heidel, pers. comm. 2000).

Sensitive Plants: This proposal is programmatic in nature; therefore, the discussion of effects will be general and qualitative rather than quantitative. The following assessment does not consider, because of the programmatic nature of this evaluation and lack of site-specific information, individual species ecological or biological requirements. Individual species requirements would be addressed in site-specific planning.

The criteria for evaluating potential effects to sensitive species are: 1) would implementation of the alternatives result in a loss of viability or distribution throughout the analysis area of the sensitive species; or 2) would implementation of the alternatives move sensitive species toward federal listing under the ESA. An assumption made here is that all regulations, policies, and direction of the FS and BLM would be followed with the implementation of any alternative; therefore, none of the alternatives, if fully implemented, would result in loss of viability of these species or move towards federal listing.

No Action Alternative

Weeds: This alternative has the greatest risk for expanding existing and introducing new weeds to BLM and FS lands. It retains the status quo for acres open (16 million acres) and seasons of use; therefore, the potential for OHV's to transport seed and create receptive seedbeds is the highest. The potential for creating new roads and trails exists and they

provide excellent avenues for weed invasion, thus increasing the effects across all the resources. The potential is highest in areas with gentler slopes and open conditions. These conditions are much more common in the central and eastern portions of the analysis area.

The loss of native plant species and communities would continue as the weeds replace some of the native plants. This loss leads to a series of other indirect effects: loss of wildlife habitat; increased erosion for some of the weeds; increased weed suppression costs; loss of forage production for livestock permittees; decreased economic outputs if the loss continues. Adverse economic effects resulting from losses of domestic and wildlife habitat would increase.

In addition to the effects described above, there would be a need to apply additional amounts of suppression activities, such as herbicides, grazing sheep and goats for leafy spurge, pulling and grubbing to control the establishment of new weed infestations. Each of these techniques has its own set of environmental effects, such as the damage to nonweed vegetation with some herbicides, or using grazing animals. They also can create conflicts with other goals, such as recovery of predators (e.g., wolves and grizzly bears).

Western Prairie Fringed Orchid: Motorized wheeled cross-country travel may eliminate or seriously affect populations of the orchid, either directly through the activity itself or indirectly through habitat modifications. For example, noxious weeds such as leafy spurge can be dispersed by OHV travel and pose a serious threat to orchid populations on the Shyenenne National Grassland. Without any management of motorized wheeled cross-country travel, these types of effects may continue to occur. The implementation of this alternative May Affect, and is likely to adversely affect the western prairie fringed orchid.

Spalding's Catchfly: Effects as a result of motorized wheeled cross-country travel may be direct or indirect. Direct effects could be from crushing, trampling or destroying actual plants. Indirect effects would be through habitat modifications, such as invasion by noxious weeds. Without any management of motorized wheeled cross-country travel, these types of effects may continue to occur. Although Spalding's catchfly has not yet been found on BLM or NFS lands in Montana, its valley (Palouse) grassland habitat is limited in extent on such lands. Furthermore, some of the suitable habitat in Montana has been surveyed. While this species occurs sparsely on such lands, the likelihood of key populations being present on BLM or NFS lands is low. Thus, the likelihood for these effects to occur is fairly low; therefore, the implementation of the No Action alternative is not likely to jeopardize the continued existence of the Spalding's catchfly.

Sensitive Plant Species: Motorized wheeled cross-country travel may directly and indirectly impact sensitive plant species. Under the No Action Alternative, OHV's may crush, trample, or destroy sensitive plants. Indirect effects are a result of habitat alterations. These changes include increased bare soil, soil surface temperatures, soil compaction, runoff, erosion, and increased spread of and competition with noxious weeds. As stated before, existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. However, specific effects to sensitive plants cannot be determined without site-specific surveys. In the absence of additional surveys, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend towards federal listing or loss of viability to the population or species. This alternative has the greatest risk to sensitive plant species.

Alternatives 1, 2 and 5

Weeds: Alternatives 1, 2 and 5 and their overall effects are similar and will be discussed together. These three alternatives restrict OHV's to roads and trails with certain exceptions. The direct effects are a substantial reduction in the probability of introducing weeds by cross-country OHV use, because less vegetation and soil would be disturbed as a result of unplanned user-created trails and roads. Indirectly, the current detection and treatment of new infestations would be more effective, since the limited funds would not be spread as thin.

Alternatives 2 and 5 are slightly less effective than Alternative 1 because of exceptions for lessees or permittees to use equipment, and an exception for camping that is 300 feet from a road or trail. Alternative 2 also has an exception for big game retrieval. The effects are slight because of several factors. The acreage difference involved in the camping exception is relatively small, and travel would be concentrated primarily in areas traditionally used for dispersed camping and picnicking spots. The proximity of new infestations to a road or trail make detection and treatment much more likely. Some permittees/lessees are required to wash their vehicles to minimize the amount of seed transported off roads and trails. Travel for big game retrieval has more risk than permit holders (required to clean their vehicles) because no cleaning of the vehicle is required. However, there would only be one round trip during retrieval; therefore, relatively little vegetation and soil disturbance would result, which means any seed delivered to the site would not have a very conducive environment in which to become established.

Western Prairie Fringed Orchid: Under these alternatives, motorized wheeled cross-country travel would not be

allowed with certain exceptions. Under Alternatives 2 and 5, administrative use by federal employees, lessees, and permittees would also not be allowed in known orchid habitat without prior approval so as to eliminate impacts to occupied habitat. The direct and indirect effects associated with motorized wheeled cross-country travel would be substantially reduced or eliminated. The conclusion of effects of this alternative is No Effect.

Spalding's Catchfly: Under these alternatives, motorized wheeled cross-country travel would not be allowed except as described in Chapter 2. The direct and indirect effects associated with motorized wheeled cross-country travel would be reduced. However, potential habitat for this species does exist and may continue to be impacted by OHV use due to the exceptions, although the likelihood for direct or indirect effects to occur is fairly low; therefore, the implementation of any one of these alternatives is not likely to jeopardize the continued existence of the Spalding's catchfly.

Sensitive Plant Species: Under these alternatives, motorized wheeled cross-country travel would not be allowed with certain exceptions. Administrative use by federal employees, lessees, and permittees would also not be allowed in known orchid habitat without prior approval under Alternatives 2 and 5. These alternatives would greatly reduce or eliminate direct crushing, trampling, or destruction of sensitive plants. In addition, ongoing habitat alterations as a result of motorized wheeled cross-country travel would also be reduced or eliminated. Although the potential for impacts to sensitive plants is very low, specific effects cannot be determined without site-specific surveys. In the absence of additional surveys, the implementation of either alternative may impact individuals or habitat but would not contribute to a trend toward federal listing or loss of viability to the population or species. Any of these three alternatives would provide the greatest protection of sensitive species and their habitats.

Alternative 3

Weeds: This alternative has the same effects as Alternative 2 for the areas where OHV's are restricted, which involves an estimated 6.5 million acres. Simply stated, the potential for weed spread by OHV's during motorized wheeled cross-country travel is greatly reduced. Alternative 3 has similar effects to the No Action Alternative for the areas where they are not restricted with two important differences. First, the areas open for motorized wheeled cross-country travel are in western Montana, except the Lolo National Forest and Missoula Field Office, which are already restricted. These lands are generally too steep and/or densely vegetated to be traversed by OHV's; therefore, much of the "open" acreage is not available to OHV use and

is at minimal risk to weed spread. However, the areas that are not forested are often quite susceptible to weed invasion, as evidenced by the tremendous amount of spotted knapweed in the bunchgrass communities throughout much of western Montana. The second exception in comparing this alternative to the No Action Alternative is that BLM lands in the central and eastern part of Montana are at lower risk of weed infestation from motorized wheeled cross-country travel because: a) many of the parcels are land-locked by private owners and, therefore, access is restricted; b) they have very little use by OHV's; c) the amount of weeds currently present or adjacent to some of these areas is quite low.

The areas that remain open to motorized wheeled cross-country travel will continue to see expanded weed spread due to the difficulty of detecting new weed infestations in remote, rarely traveled locations until they are well established and more expensive and difficult to eradicate, if it is still possible. Overall, this alternative has substantially less acreage at risk of weed invasion from OHV use than the No Action Alternative, but more than Alternatives 1, 2, and 5. See Table 3.1 for an acreage comparison.

Western Prairie Fringed Orchid: Under this alternative, motorized wheeled cross-country travel would not be allowed with a few exceptions. Administrative use by federal employees, lessees, and permittees would be allowed under this alternative, which could potentially impact this species and its habitat; therefore, the implementation of this alternative May Affect, but is not likely to adversely affect the western prairie fringed orchid.

Spalding's Catchfly: In Alternative 3, motorized wheeled cross-country travel would not be restricted in northwestern Montana. Since potential habitat for this species within the entire analysis area occurs only in northwestern Montana, the determination of effects is the same as the No Action Alternative. The implementation of Alternative 3 is not likely to jeopardize the continued existence of the Spalding's catchfly.

Sensitive Plant Species: This alternative has effects similar to Alternative 2 for areas where motorized wheeled cross-country travel is restricted. For the open areas in this alternative, the effects are similar to those described in the No Action Alternative. The implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 4

Weeds: This alternative does not reduce the risk of any acres compared to the No Action Alternative, so the poten-

tial number of acres is the same. The open summer season (June 15-August 31) coincides with the seed production of most weed species; therefore, seed spread would occur. There is some benefit in that during this time period the soils are less likely to be rutted, displaced and disturbed; therefore, reducing the amount of potentially receptive seedbed. There is also some reduction of potential weed invasion through the restricted timeframe just by the reduction in number of trips that would be made. This is especially pertinent for areas where a substantial amount of use occurs during the hunting season. Overall effects are similar to the No Action Alternative.

The winter open period is lower risk than the summer for several reasons: a) since much of the seed has already been dispersed; b) typically during this time period the ground will be frozen and not susceptible to much disturbance and most of the grass and herbaceous plants are not likely to be impacted, although shrubs can be broken; c) the number of users during this time period is much lower and many areas are inaccessible with OHV's due to snow depths.

Western Prairie Fringed Orchid: In this alternative, motorized wheeled cross-country travel would be allowed during the summer months, which coincides with the flowering period of this species; therefore, existing direct effects may continue. Indirect effects through habitat alterations may also occur, as motorized wheeled cross-country travel would be allowed for parts of the year. The implementation of this alternative May Affect, and is likely to adversely affect the western prairie fringed orchid.

Spalding's Catchfly: In this alternative, motorized wheeled cross-country travel would be allowed during the summer months, which coincides with the flowering period of this species; therefore, existing direct effects may continue to occur. Indirect effects through habitat alterations may also continue to occur, as motorized wheeled cross-country travel would be allowed for parts of the year. Although Spalding's catchfly has not yet been found on BLM or NFS lands in Montana, its valley (Palouse) grassland habitat is limited in extent on such lands. Furthermore, some of the suitable habitat in Montana has been surveyed. While this species may occur sparsely on such lands, the likelihood of key populations being present on BLM or NFS lands is low. Thus, the likelihood for these effects to occur is fairly low; therefore, the implementation of Alternative 4 is not likely to jeopardize the continued existence of the Spalding's catchfly.

Sensitive Plant Species: This alternative would allow motorized wheeled cross-country travel during the summer months (June 15-August 31), which coincides with the flowering and seed production of many sensitive plant species; therefore, existing direct effects may continue.

Indirect effects through habitat alterations may also occur, as motorized wheeled cross-country travel would be allowed for parts of the year. Overall effects are similar to the No Action Alternative. The implementation of this alternative may impact individuals or habitat, but would not contribute to a trend towards federal listing or loss of viability to the population or species.

Cumulative Effects

Weeds: Both BLM and FS have recognized the need to do more vegetation treatments, especially in forested conditions, but also in shrublands. Often these treatments takes the form of substantially increased amounts of prescribed burning and in some areas it will involve timber harvests, especially thinnings, to improve the diversity of wildlife habitat, reduce the risk of undesirable wildfires, protect watersheds, etc. The activities that make the forests more open and temporarily remove the trees create more receptive conditions for weed invasion. Alternatives 1, 2, 3 and 5 that reduce the risk of weed spread through OHV management, also reduce the risk of weed spread into the areas where the vegetation is temporarily disturbed by fire and/or timber harvests.

OHV use for motorized wheeled cross-country travel is only one of many ways that weeds can be spread. The elimination of motorized wheeled cross-country travel by itself would not make a large difference in weed spread. However, it could make an incremental difference. The same can be said of the weed seed-free forage program for packstock use on public lands; by itself it won't make a large difference, neither would requiring the cleaning of equipment used on timber sales, utility corridors, fish habitat improvement projects, etc. The National Off Highway Vehicle Conservation Council has promoted the use of OHV's on roads and trails, with part of the rationale based on their concern for the spread of noxious weeds. However, as all of these practices are implemented across public lands, their cumulative effect is to substantially reduce the risk of invasive exotics spreading across the landscape.

The invasion of native plant communities by invasive weeds should be viewed as an irretrievable commitment of resources once they are beyond the initial eradication stage. After that point the effort is to try and minimize their effects on all the resources cited previously and minimize their spread to uninfested areas. It means an ongoing effort into the foreseeable future of expenditures in Integrated Pest Management (IPM) efforts. If IPM efforts are not implemented, then short-term losses in habitat use by wildlife, recreationists, livestock permittees, reductions in biodiversity, and loss of topsoil through increased rates of erosion will occur, which often leads to increased sedimen-

tation in streams and lakes. These same effects on short-term use can turn into long-term productivity losses for all those items just listed.

Threatened, Endangered, and Sensitive Plant Species:

Cumulatively, numerous factors have the potential to impact threatened, endangered, and sensitive (TES) species. These include management activities, such as timber harvest, livestock grazing, fire suppression, and road building. Other natural events, such as fire, floods, drought, and minor climatic shifts, can also impact TES species. The incremental effects contributed by motorized wheeled cross-country travel would include continued direct and indirect effects as described under the No Action Alternative. Of particular concern are the indirect effects of habitat loss due to invasive weeds. Habitats that are most vulnerable to invasive weeds are dry forests at lower elevations and grasslands in valley and montane zones. These are also the same habitats that are most conducive to motorized wheeled cross-country travel. Under the No Action Alternative and Alternative 4, the spread of invasive weeds due to motorized wheeled cross-country travel would continue to occur. The invasion of TES plant habitat by invasive weeds could be viewed as an irretrievable commitment of resources, as these habitats would no longer be available to TES plants. Under Alternatives 1, 2, and 5 the direct and indirect effects associated with motorized wheeled cross-country travel would be reduced or eliminated. However, habitats that are already infested with weeds would still be unavailable to TES plants and would still be considered an irretrievable commitment of resources unless very intensive eradication and restoration efforts were undertaken. Alternative 3 would be similar to the No Action Alternative on the Kootenai, Flathead, and Bitterroot National Forests. In the rest of the analysis area, Alternative 3 would be similar to Alternative 2.

Comparison of Alternatives

Figure 3.7 shows the relative risk of each alternative for TES plants and weed invasion risk from OHV cross-country use only, use on roads and trails is not included. Roads and trails are major avenues of weed invasion but

their effect is the same across all alternatives and therefore, do not change between alternatives. Site-specific analysis would address the role of weed spread associated with roads and trails.

OHV cross-country use is only one of many ways that weeds are spread. The action alternatives make an incremental difference commensurate with the proportion motorized wheeled cross-country travel contributes towards the whole picture of weed spread.

The No Action Alternative is the highest risk because it has the greatest area open (15.8 million acres) for the longest periods of time and the least number of restrictions. Alternative 4 is slightly less than the No Action Alternative since the seasonal restrictions would reduce the amount of use during hunting seasons. However, the acreage open is the same and the season of use is during seed dispersal times for the weeds. Alternative 3 is substantially less at risk because only 6.5 million acres are open, and of the land that is open, many acres are not available because dense forests make traversing it unrealistic. Alternatives 1, 2 and 5 are the lowest risk because they restrict most areas to motorized wheeled cross-country travel. Alternative 1 is slightly better due to the exceptions in Alternatives 2 and 5.

WILDLIFE

AFFECTED ENVIRONMENT

Introduction

This section provides a basis from which OHV effects on wildlife can be addressed adequately for a three-state area. Descriptions of broad vegetative zones as inhabited by groups of animals provide the most common level of description needed for this analysis.

Over 600 species of fish and wildlife occupy public lands in the analysis area, either seasonally or yearlong. Species of special interest include big game, game birds, waterfowl, carnivores, predators, fur bearers, those designated as sen-

Figure 3.7
Relative Risk of Alternatives to Invasive Weed Spread and Threatened, Endangered, and Sensitive Plants



sitive, and those listed as threatened or endangered. Threatened and endangered (T&E) species are listed in Appendix F. The BLM species of special concern and FS sensitive species are also listed in Appendix F. There are 80 animal species of special concern or sensitive species in the three-state area.

The vegetative description in the Vegetation and Weeds section adequately describes wildlife habitat. Of particular importance to wildlife are special habitats such as riparian and sagebrush.

Rocky Mountain Region

Mountainous areas provide seasonal habitats for a large number of ungulates that migrate from high elevation in the summer and fall, to lower elevations, usually south facing slopes, in the winter and spring. Elk, mule deer, white-tailed deer, moose and bighorn sheep are common to the forests of Montana. Dense forests with steep slopes extend from the west into the more open, generally less steep, country of the southern forests of the Gallatin and Beaverhead-Deerlodge National Forests. The western forests meet the plains along the Rocky Mountain Front of central Montana. The Rocky Mountain Front is an extensive winter range area that serves much of the wildlife that summer in the Bob Marshall, Scapegoat, and Great Bear Wilderness Areas. Other unique species of high public interest found in the mountains include carnivores such as wolverine, pine marten, fisher, mountain lion, threatened grizzly bear and lynx, and the endangered gray wolf.

In the past, both engineered and user-created roads followed drainage bottoms, which were the paths of least resistance. These locations created the worst situations for resident wildlife since riparian areas are important habitats. Likewise, OHV use off these main roads often follows side drainages and possibly ridgelines, which are also highly utilized by wildlife. The remainder of the mountainous area is generally not conducive to motorized wheeled cross-country travel because of steepness of slope and the density of vegetation in the forests (M. Hillis, pers. comm. 1999). In the forests of southwest Montana, motorized wheeled cross-country travel is relatively common in some locations due to patchy and less dense vegetation and, in some areas, more gentle terrain (M. Cherry, pers. comm. 1999).

Small mammals can be found throughout the mountains and associated habitats. Some occupy unique environments such as alpine habitats and bogs. Pocket gophers, pikas and marmots are common in alpine habitats, as is the chipmunk. In a sense, alpine zones are ecological islands within mountain ranges (Fitzgerald et al. 1994). Animals occupying these alpine zones are susceptible to extinction if severely impacted. Bogs provide fragile habitat with unique

wildlife. In Montana, the northern bog lemming is classified as a state rare species dependent on bogs or peatlands (Reichel 1998, Flath 1998, MTNHP 1999), and several other small mammal species may be commonly associated with bogs (Joslin and Youmans 1999).

Great Plains and North American Prairie Regions

Sagebrush habitat in this region is key to the existence of particular wildlife species. Often occurring along mountain foothill areas, sagebrush habitats serve as winter range and can be the most important dietary item to mule deer. Grasses on sagebrush winter range areas are most important to elk and bighorn sheep, but if grasses are scarce sagebrush can become important in the diet of elk. Sagebrush habitats also occur throughout the Missouri River breaks, the broken terrain and rimrock areas in south-central Montana, and through similar terrain along the Yellowstone River. These habitats are important to elk and mule deer. Bighorn sheep populations are found in localized areas of North Dakota and central, western, and southern Montana.

User-created roads in these habitats have impacted wildlife, principally because of the increased human intrusion into the area as a result of a new road. Many of these roads were started and developed for hunting purposes. According to FS and BLM personnel, motorized wheeled cross-country travel is prevalent year-round on the Beaverhead-Deerlodge National Forest and nearby BLM lands (G. Mariani and J. Roscoe, pers. comm. 1999). In this area, nearly every ridge that can be traveled contains a user-created road. Two examples of detrimental effects include enough spring travel on user-created roads to stress elk in sagebrush-nursery areas, and travel to sagegrouse leks to observe them at their ritual dance.

Pronghorn antelope and sagegrouse are particularly dependent upon sagebrush habitat. Antelope depend on sagebrush as forage during the winter, which often exceeds 80% of their diet. Typical sagebrush inhabited by antelope contains sagebrush plants less than 24 inches in height with a variety of forbs and other forage occupying the site. These sagebrush stands have less than 50% cover and other components, such as water, are present (Cooperrider et al. 1986).

The importance of sagebrush to sage grouse has been well documented. They prefer sagebrush with a canopy cover greater than 15% for cover and food. Sagebrush provides 80% to 100% of the sage grouse's winter diet. Nesting habitat is often located under robust sagebrush plants.

Other species typically found in sagebrush habitats include sage thrasher, sage sparrow, Brewer's sparrow, pygmy

rabbit, white-tailed jack rabbit, great basin Kangaroo rat, deer mouse, Columbian ground squirrel, coyote, black-billed magpie, horned lark, burrowing owl, ferruginous hawk and other raptors. Some reptiles occur in sagebrush habitats, including the common garter snake, western rattlesnake, gopher snake, and horned lizard.

Native grasslands are the undisturbed areas left after conversions into agricultural lands. Unfortunately, river bottom areas have been the first to be converted, so much of the remaining grasslands occupy uplands. The ecotone between shrublands and grasslands has the greater diversity of species and this zone most often occurs along the mountain foothill areas. Ponderosa pine forests of southeastern Montana occupy a large area and contain healthy populations of white-tailed and mule deer as well as Merriam's wild turkey.

The mixed plains grasslands support a wide variety of wildlife. Many grassland animals are burrowers and others are swift runners. The pronghorn antelope is a common large mammal along with mule and white-tailed deer. Significant numbers of upland nesting waterfowl are found using potholes and reservoirs where upland cover is adequate for nest concealment and successful nesting. Nearly 15% of the continental population of ducks is produced from the Prairie Pothole Region (Montana, North Dakota, South Dakota, Minnesota and Iowa). Canada, snow, and white-fronted geese, swans, and over 20 species of ducks occur in Montana, North Dakota and South Dakota.

Sharp-tailed grouse occur throughout the plains and lower foothills east of the continental divide where native range is in good condition. They are more prevalent on upland mixed prairie than on sagebrush-saltbush areas. Sharp-tails nest on uplands in dense stands of residual cover but can also use brushy coulees. Woody draws and woodlands provide food and thermal cover during winter.

Of special note are prairie dog towns that are often the result of heavy grazing. These areas contain bare ground and low cover value. Although habitat appears limited with low species diversity, the exact opposite holds true. A total of 163 vertebrate species were reported on black-tailed prairie dog colonies in Montana (Reading et al. 1989, Koford 1958, Tyler 1968, Campbell and Clark 1981, Clark et al. 1982, Agnew 1983). Agnew and others (1986) found significantly higher densities of birds and mammals and greater avian species richness on prairie dog colonies than on adjacent prairie. The black-footed ferret, golden eagle and others prey on prairie dogs. Burrowing owls and cottontails inhabit unused burrows, and mountain plovers and others benefit from the environmental alterations by prairie dogs. The one notable effect from motorized wheeled cross-country travel in the jurisdiction of the Malta Field Office

of BLM is that such travel can contribute to the numbers of prairie dogs killed by shooting. During a period of time when prairie dog populations are low and in an area where the black-footed ferret has been introduced and is recovering, the influence of motorized wheeled cross-country travel is not desirable (J. Grensten, pers. comm. 1999).

Since motorized wheeled cross-country travel across grasslands is so free of physical barriers, user-created roads and/or trails lead to the most interesting features, which are often the important wildlife habitats such as sharp-tailed grouse leks and prairie dog towns.

Threatened, Endangered, and Proposed Species

The U.S. Fish and Wildlife Service (FWS) provides lists of T&E species that may occupy habitats on public lands in the three-state area that include one insect, three fish, four birds, four mammals, and three plants. In addition, there are two species, one bird and one plant proposed for listing. The fish are discussed under the Aquatic section and the plants are described under the Vegetation and Weeds section of Chapter 3.

American Burying Beetle: This endangered species is listed only for South Dakota and is only known to occur in Gregory and Tripp Counties. BLM has 172 and 160 surface acres, respectively, in these two counties. Suitable habitat for the beetle is any site with significant humus or topsoil for burying carrion (USFWS 1995). This species is very rare and has not been found on BLM and NFS lands in South Dakota. The likelihood that it does occur on BLM or NFS lands is also low. Therefore, existing impacts from motorized wheeled cross-country travel should be minimal.

Whooping Crane: This endangered species has not been documented on public lands in Montana, North Dakota or South Dakota. Migrations pass over this area, but the important rituals in their life cycles are performed elsewhere. Hazards encountered by this species during migration include collisions with power lines, predators, illegal shooting, and conversion of resting habitat for agricultural uses. OHV use has not been identified as a threat to the Whooping Crane.

Bald Eagle: This threatened species is a migrant in North Dakota and South Dakota but occurs year-round in Montana and has made significant gains in breeding numbers. In 1978, only 12 breeding pairs were known in Montana (Servheen 1978). Spring counts in 1998 totaled 248 nests, which exceeds recovery goals (D. Flath, pers. comm. 1999). In Montana, bald eagles use riparian and wetland habitats during breeding season and choose old, large diameter trees for nesting (Montana Bald Eagle Working Group 1994). On

the west side of the continental divide where most of the nests are located, no evidence has surfaced that indicates OHV disturbance of nest sites is a problem (M. Hillis, pers. comm. 1999). The bald eagle is currently proposed to be delisted.

Piping Plover: This threatened species nests on sand and pebble beaches. In North Dakota they have also been documented on saline wetlands. Both habitats occur on public lands. One piping plover nest has been documented in Montana on a 16-acre parcel of BLM land in the Miles City Field Office area, which has been designated an Area of Critical Environmental Concern for the piping plover. There are no known occurrences on BLM lands in North Dakota and South Dakota, and the amount of habitat on BLM lands is limited. Habitat loss and degradation due to coastal development, recreation, navigation, dredging, and shoreline stabilization and replenishment projects have been major contributors to this species' decline. Human activity on beaches, such as walking, jogging, walking pets, and operating vehicles may prevent birds from feeding, flush birds from roost sites, alter habitat conditions, and destroy camouflaged eggs and young.

Mountain Plover: This species is proposed to be listed as threatened. Mountain plovers would most likely occur on the shortgrass prairie of eastern Montana. Knowles and Knowles (1999) summarized their survey of mountain plovers from 1991-1998 for Montana east of the continental divide. Mountain plovers were found at nine distinct areas. They were closely associated with sites characterized by slopes under 5%, vegetative height under 6 cm, and greater than half the soil surface being bare ground, lichen and/or club moss. Often, mountain plovers are associated with prairie dog colonies.

Least Tern: Favorite nesting sites for this endangered species include bare ground (recent alluvium) on islands. One island in the Yellowstone River, adjacent to public land, contains a colony of nesting least terns. None are known to occur on public lands in the analysis area. During spring and fall, least terns may use stock water reservoirs. Dams, reservoirs, and other changes to river systems have eliminated most historic least tern habitat.

Black-Footed Ferrets: Prairie dog colonies are key to the endangered black-footed ferret, although ferrets have been observed in ground squirrel colonies. Burrows provide shelter and the prairie dog itself is food for the ferret. Large colonies or complexes are needed for ferret survival, and this is the reason Phillips County was chosen as Montana's reintroduction area. The program was initiated in 1994 and yearly releases have occurred ever since. According to the FWS, 41 ferrets were counted there during the fall of 1998 (R. Matchette, pers. comm. 1999). In the past, these prairie

dog towns in Phillips County have been important to a significant number of sport shooters. Because of a recent decline in prairie dogs, BLM closed some of these towns to shooting. This will reduce the amount of OHV travel in the area.

Gray Wolf: The recovery plan for this endangered species discussed three areas for wolf recovery including the Central Idaho Recovery Area, the Northwest Montana Recovery Area, and the Yellowstone Recovery Area (USDI 1987). The goal for delisting was to establish 10 or more packs in each of these three areas. Increases in gray wolf number, expansion of the species' occupied range, and progress toward achieving the reclassification and delisting criteria of several approved gray wolf recovery plans have led to a proposed downlisting of this species throughout most of its range, including Montana, North Dakota, and South Dakota. Gray wolves in Montana, North Dakota, and South Dakota will be reclassified from endangered to threatened, except where classified as an experimental population, if this proposal is finalized (65 FR 43449, July 13, 2000). Wolves first expanded down from Canada in northwest Montana and have continued expansion ever since. Recently, successful releases in Yellowstone Park and central Idaho advanced the process. Key components of wolf habitat include sufficient year-round big game prey base and secluded denning and rendezvous sites with minimal exposure to humans. Riparian and wetland sites are especially important for rendezvous sites, which are specific resting and gathering areas for the packs after the whelping den has been abandoned. Beaver provide an important alternate prey in these areas during ice-free times ('USDI 1987).

Grizzly Bear: This threatened species is maintaining its population in two ecosystems, the Northern Continental Divide Ecosystem of western Montana and the Yellowstone Ecosystem of southwestern Montana and portions of Wyoming and Idaho (primarily centered in Yellowstone National Park). Other ecosystems with some limited grizzly bear occupancy include the Selkirk and Cabinet-Yaak Mountains of Montana, the Selway-Bitterroot of Montana and Idaho, and the North Cascades of Washington. A recent proposal to reintroduce grizzly bears in the Selway-Bitterroot has met with serious opposition from some segments of the public.

Grizzlies are opportunistic and omnivorous and feed on animal or vegetable matter. Herbaceous plants are utilized, as are ground squirrels, carrion, garbage, ungulates, roots, fruits, berries, tubers, fungi, pine nuts and even tree cambium. Bears occasionally prey on livestock and also are attracted to bone yards and dead livestock. Many bear foods, both animal and vegetable, occur in riparian and wetland areas, with some of the berry producing shrubs

occurring in the uplands. Large areas of relatively undisturbed land with food, cover, denning habitat, solitude, and space are important for effective grizzly bear habitat (Inter-agency Grizzly Bear Committee 1987, Craighead and others 1982). The Grizzly Bear Recovery Plan (USDI 1993) identifies human depredation, competitive use of habitat, and livestock grazing as sources of conflict.

Canada Lynx: In March 2000, the Canada lynx was listed as threatened. Lynx occur primarily in the boreal, sub-boreal, and western montane forests of North America. In Montana, the western montane forests include spruce/fir, Douglas-fir, and fir-hemlock vegetation types dominated by lodgepole pine, Engelmann spruce, subalpine fir, aspen, and whitebark pine at 1,400-2,700 m. Snowshoe hares are the primary prey of lynx, although diet can be more varied in the summer than the winter. Fire mosaics contribute to snowshoe hare abundance. Motorized wheeled cross-country travel has probably had very little influence on lynx because they occupy habitats of dense forests at high elevations surrounded by slopes too steep to accommodate vehicular travel.

Sensitive Species

For the FS, a sensitive species is one that has been designated by the Regional Forester because of concern for population viability, as evidenced by: 1) significant current or predicted downward trends in population numbers or density; and/or 2) significant current or predicted downward trends in habitat capability that would reduce an existing species' distribution. For the BLM, species of special concern are defined as native species which are either low in number, limited in distribution, or have suffered significant habitat losses. Although these species are not covered under the Endangered Species Act, their conservation is required by FS policy (FS Manual 2670) and by BLM policy (BLM Manual 6840). Currently, the FS has 34 and the BLM has 46 animal species designated as sensitive within the analysis area. These species occupy a wide range of habitats throughout the analysis area. Some of these sensitive species and habitats are vulnerable to motorized wheeled cross-country use.

Existing Impacts from Vehicles on Wildlife

Travel by vehicle is presently occurring both on and off roads on public lands as allowed for in forest plans and resource management plans. Some level of impact is occurring to wildlife wherever this travel is allowed. Factors such as habitats and species present, density of species, location of travel in relation to important habitats, time of year or even time of day, amount of vehicle travel, and a myriad of other factors could apply in determining what and how much impacts are occurring.

The extensive literature review conducted by the Montana Chapter of the Wildlife Society, "Effects of Recreation on Rocky Mountain Wildlife Habitat" (Joslin and Youmans 1999), contains an exhaustive listing of research, much of which relates to vehicular effects on wildlife. However, most of the studies that have been undertaken are of impacts from roads and do not address the question concerning impacts from motorized wheeled cross-country travel. Continued motorized wheeled cross-country travel in an area results in the creation of user-created roads. This report describes effects from roads, including habitat fragmentation, isolation of rare and unique habitats such as bogs or alpine areas, direct effects such as collisions with animals causing death and injury as well as physical destruction of habitats, abandonment of habitat features such as nests to abandonment of home ranges, and physiological penalties from unnecessary energy expenditures because of vehicular harassment.

Smaller animals, reptiles and amphibians are most likely to be directly killed by vehicles and are especially vulnerable when crossing roadways. Motorized wheeled cross-country travel may disrupt habitat to the point that it becomes unusable by reptiles and amphibians (Busak and Bury 1974). The diversity, density and biomass of small mammals are inversely related to the level of OHV use (Bury et al. 1977). Habitat modification through vegetation and soil disturbance may also impact many small mammals. Sensitive habitats such as alpine areas, bogs, and arid areas would be most vulnerable from impacts to vegetation.

Even though many responses of small mammals to recreationists may be short-lived, both the long-term and cumulative effects of repeated disturbance may not be immediately obvious. According to Knight and Cole (1991), effects often include abandonment of disturbed areas in favor of undisturbed sites or, in some cases, attraction to recreational activities (Phelps and Hatter 1977, Klein 1971). This may lead to behavioral alterations such as mating, feeding and predator avoidance. Disturbance can also reduce the vigor of small mammals. For example, elevated heart rates, energy expended in disturbance flights, and reductions of energy input through disturbance will all increase energy expenditures or decrease energy acquisition. These may result in increased sickness, disease and potential death of small mammals (Knight and Cole 1991). While these responses have been suggested, evidence is largely circumstantial (Hutchins and Geist 1987).

Some raptors, such as the ferruginous hawk, can be extremely sensitive to vehicular visits, especially during courtship and nest building. Trespass can result in nest abandonment. With increased recreational pressures raptor populations could decline. People can also disrupt raptor behavior at times other than breeding season. Flushing birds from

foraging perches and day or night roosts can be particularly stressful during periods of prey scarcity and/or severe weather (Holmes et al. 1993, Stalmaster 1987, Stalmaster and Newman 1978, Bueler et al. 1991, Grubb et al. 1992).

Effects from habitat fragmentation are recognized with songbirds. Roads and trails add to forest fragmentation by dissecting large patches into smaller pieces and by converting forest interior habitat into edge habitat (Askins 1994, Askins et al. 1987, Reed et al. 1996, Schonewald-Cox and Buechner 1992). Fragmentation of limited, high-value habitats such as riparian areas may cause some of the most severe impacts on songbirds. Grassland-shrubland songbird species are likewise vulnerable to road and trail activities. Trails and roads will create edge habitat for predators and will reduce patch size of remaining habitat for area-sensitive species.

The impacts of OHV's within open habitats may also be greater than within forested areas, simply because much more area is accessible and because a number of larger, low-density birds such as raptors and ravens nest along prominent landmarks (cliffs) in these habitats. Species such as ravens (Hooper 1977), golden eagles and prairie falcons (Fyfe and Olendorff 1976) can easily be disturbed during the nesting season.

Deer, elk and other ungulates experience physical stress and expenditure of energy when disturbed by vehicles. The winter season is a particularly critical period for big game, since physical stress is already relatively high and vehicular disturbance during this time could have serious effects. Other seasons are also important. During the summer, animals must build up fat reserves to carry them through the winter. Adult males must meet energy demands of rapid horn and antler growth. Adult females must meet the energy demands of lactation and the developing neonates.

In Montana, there has been more interest in the effects of roads on elk than any other species besides the grizzly bear. Displacement from selected habitats over time is a much more serious impact to elk than the immediate response of fleeing from a disturbance. Studies have repeatedly shown that vehicle traffic on forest roads establishes a pattern of habitat use in which areas nearest the road are not fully utilized by elk (Marcum 1976, Marcum and Edge 1991, Perry and Overly 1976, Rost 1975, Rost and Bailey 1974, 1979, Thiessen 1976, Ward 1976, Ward et al. 1973, Edge and Marcum 1991, 1985, Edge et al. 1987, Lyon 1979, 1983). With only two miles of roads open to vehicular traffic per square mile, the area impacted can easily exceed half of available elk habitat (Lyon 1983).

The forests and shrublands of southwestern and southern Montana are more conducive to motorized wheeled cross-

country travel due to moderate terrain and vegetative conditions. Unfortunately, little has been documented of the relationship between elk and motorized wheeled cross-country travel. Since this travel would be more random and probably less intense than along a road, displacement may not occur except during hunting season. However, motorized wheeled cross-country travel could work to protect elk by driving them further back into tougher country, potentially lowering the success of harvest during hunting season (R. Roginske, pers. comm. 1999). In the Bitterroot National Forest, increased levels of horn hunting may stress elk in their winter/calving area in late spring (J. Ormisten, pers. comm. 1999). A similar problem has been noted on the Gallatin National Forest (M. Cherry, pers. comm. 1999), and in the Missouri breaks horn hunters have even been observed chasing antlered bull elk with OHV's in the spring with the intent of being present when the elk lost their antlers (M. Williams, pers. comm. 1999).

The combination of motorized wheeled cross-country travel and hunting has led to examples of unethical sportsmanship, especially on opening weekends. As described by Posewitz (1994), herding fleeing antelope with vehicles and taking flock shots at long ranges has disastrous results. High crippling loss and less opportunity for ethical hunters are two of the most important effects. Adequate travel planning and OHV restrictions could reduce this kind of activity from being so prevalent.

The other animal that has been intensely examined as to how it relates to roads is the grizzly bear. Agencies responsible for this threatened species' welfare have spent countless time and money on research, cumulative effects and access modeling to determine the best way to manage roads in grizzly bear country. These efforts have been undertaken in both the Northern Continental Divide and Yellowstone Subcommittees of the Interagency Grizzly Bear Committee; therefore, most of the occupied habitat of the grizzly contains protective road closures of one sort or another. The Northern Continental Divide Subcommittee has established access standards to alleviate effects on grizzlies from either roads or trails. Motorized wheeled cross-country travel has not been addressed as being the problem to bears that roads are, but possibly could if "recreational play" became intense enough in an area of important bear habitat. This would be addressed by site-specific activity planning. Much of the grizzly bear occupied habitat in northwest Montana is dense forest with steep slopes that naturally exclude motorized wheeled cross-country travel. An exception to this situation may be in the Gallatin Forest of the Yellowstone grizzly bear ecosystem, where vegetation is more open and slopes are gentler (M. Cherry, pers. comm. 1999).

One of the most serious impacts on wildlife from vehicles has been indirect. Vehicle traffic has been linked with the

establishment and spread of noxious weeds in wildlife habitat. Noxious weeds may reduce the quality and quantity of summer forage for ungulates, resulting in poorer reproductive performance over the lifetime of an animal. Experience in western Montana has shown that noxious weeds are capable of influencing ecosystems, and risks of habitat impacts are high without an aggressive program of prevention and rapid response to weed establishments.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

This proposal is programmatic in nature; therefore, the discussion of effects will be general and qualitative rather than quantitative. The following assessment does not consider, because of the programmatic nature of this evaluation and lack of site-specific information, individual species' ecological or biological requirements. Individual species' requirements would be addressed in site-specific planning. Potential site-specific effects on any given species or habitat would be evaluated during site-specific planning.

The criteria for evaluating potential effects to sensitive species are: 1) would implementation of the alternatives result in a loss of viability or distribution throughout the analysis area of the sensitive species; or 2) would implementation of the alternatives move sensitive species toward federal listing under the Endangered Species Act. An assumption made here is that all regulations, policies, and direction of the FS and BLM would be followed with the implementation of any alternative; therefore, none of the alternatives, if fully implemented, would result in loss of viability of these species or lead towards federal listing.

The most obvious effects to wildlife and wildlife habitats from motorized wheeled cross-country travel have been indirect and include:

- User-created roads, which often occur up or down drainageways or ridges, are now permanent fixtures on the landscape.
- Motorized wheeled cross-country travel contributes to the spread of noxious weeds that has resulted in the loss of large acreages of wildlife habitats. The classic example is the spread of spotted knapweed across the hillsides of western Montana. However, vehicular travel on roads and trails has likely been a greater contributor of weed spread than cross-country travel.
- None of the alternatives restrict OHV travel on roads and trails. Any impacts to wildlife from this type of vehicular activity would continue.

Threatened, Endangered, and Proposed Species: Under all alternatives there would be No Effect to the American burying beetle, least tern, and whooping crane due to the lack of presence in areas of OHV use.

No Action Alternative

As documented in the Montana Chapter of the Wildlife Society Report (Joslin and Youmans 1999), vehicles do impact wildlife. The severity of the impact may be in direct relationship to the amount of vehicle travel occurring. For example, the impact from an interstate highway through an area of sagebrush-grassland could have a particularly devastating effect on antelope and sagegrouse, whereas the impact from the amount of motorized wheeled cross-country travel occurring in the same area could be of little consequence to these same species. In other words, the level of impact from vehicular activity on wildlife should be directly related to the amount of activity occurring.

The current level of impact (as discussed in the above section: Existing Impacts from Vehicles on Wildlife) in the three-state area from motorized wheeled cross-country travel would continue with the No Action Alternative. Many of the direct and indirect impacts discussed in that section could affect the threatened, endangered, and sensitive species listed in Appendix F, including direct crushing of individual animals, habitat modification through vegetation and soil disturbance, abandonment of disturbed areas in favor of undisturbed sites, behavioral alterations affecting mating, feeding and predator avoidance, and nest abandonment.

Impacts from vehicles can be direct as a result of collision or crushing of individual animals, however, with small mammals most impacts are related to the impacts on vegetation and barriers created by trails and roads. Habitat fragmentation reduces effective habitat for particular species. Generally, the more important the habitat type and the smaller the home range of the species, the greater the effect of fragmentation. Fragmentation of habitat from OHV use would occur as a result of long-term and repeated use resulting in the creation of a road or trail system in the particular habitat. This situation has been documented at a number of localities, often the result of hunters and the hunting season. Under this alternative, fragmentation from motorized wheeled cross-country travel or from user-created roads and trails would continue.

Physiological effects on wildlife from human disturbances, including from vehicles, have been well documented. Most studies of these effects have been on ungulates such as deer and elk. The casual observer who visits a big game winter range and watches the deer and elk may observe little disturbance exhibited by the animals. But that observer is

unaware of the actual physiological stress the animal is experiencing and how that contributes to the animal's cost of living. Vehicular harassment on winter range, important summer range or other special habitat features can be governed by road placement. Animals can leave the area if the harassment is too severe or, possibly, adapt to it if the harassment has become frequent, both of which have negative consequences. However, motorized wheeled cross-country travel, which is less patterned and less expected, may be more relatively disruptive. All areas now open to motorized wheeled cross-country travel would remain open in this alternative, and these impacts would continue to occur.

One of the greatest indirect impacts from vehicles, both on and off roads, has been the spread of noxious weeds in wildlife habitats. Weed establishment has reduced the quality and quantity of wildlife forage over large areas. Weeds spread by OHV's are particularly hard to control as they are spread at random over large areas, and not just along a roadway. This alternative would allow motorized wheeled cross-country travel in the future and would continue to contribute to the spread of weeds and loss of wildlife habitat.

Threatened and Endangered Wildlife Species: With this alternative, the direct and indirect effects described above would continue and are expected to increase over time. Therefore, No Action Alternative May Affect but is not likely to adversely affect the bald eagle, piping plover, black-footed ferret, grizzly bear, gray wolf, and Canada lynx. The No Action Alternative May Affect but is not likely to jeopardize the continued existence of the mountain plover.

Sensitive Wildlife Species: As stated before, existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. However, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 1

This alternative would restrict motorized wheeled cross-country travel yearlong on NFS and BLM lands. Impacts from motorized wheeled cross-country travel now occurring in the three-state area (as discussed in the No Action Alternative and in the above section: Existing Impacts from Vehicles on Wildlife) would be minimized if Alternative 1 is implemented. Thus, any direct impact from vehicle/animal collisions would be minimized. Fragmentation as a

result of motorized wheeled cross-country travel would cease, including that from roads created by OHV's.

Vehicular harassment causing physiological stress of wildlife on areas that are restricted to motorized wheeled cross-country travel would be minimized. Thus, impacts to ungulates on winter range areas and summer habitat that have been affected by motorized wheeled cross-country travel would not continue. Birds nesting in heavy motorized wheeled cross-country use areas would not be subject to any negative effects from this activity. Prairie dog colonies and all obligate species that have been reached by motorized wheeled cross-country travel would no longer be affected.

This alternative would help reduce the spread of noxious weeds in areas open to motorized wheeled cross-country travel. The indirect impact of weed expansion into important wildlife habitats has recently been one of the greatest impacts to wildlife in the three-state area.

Threatened and Endangered Wildlife Species: The direct and indirect effects associated with motorized wheeled cross-country travel would be insignificant or discountable. For example, the implementation of Alternative 1 would reduce stress and potential for collisions to T&E species. Also, the spread of weeds would be reduced, which would lessen the impacts to T&E species habitat. Therefore, the overall effects of this alternative would be positive for T&E species. However, T&E species and their habitat within the analysis area may continue to be impacted by OHV use due to the exceptions for administrative and permitted uses, although the likelihood for direct and indirect effects to occur is fairly low. Alternative 1 May Affect, but is not likely to adversely affect the bald eagle, piping plover, black-footed ferret, gray wolf, grizzly bear, and Canada lynx. This alternative May Affect, but is not likely to jeopardize the continued existence of the mountain plover.

Sensitive Wildlife Species: Existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. Although potential impacts associated with motorized wheeled cross-country travel would be reduced or eliminated, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 2

This alternative is slightly less restrictive than Alternative 1 due to some exceptions. Travel by OHV's would be

allowed by lessees and permittees, as well as by government workers as they conduct business on these lands. Exceptions for the general public would be allowed for camping and game retrieval. Thus, impacts to wildlife may be slightly greater, or possibly negligible in this alternative in comparison to Alternative 1.

Threatened and Endangered Wildlife Species: The direct and indirect effects associated with motorized wheeled cross-country travel would be insignificant or discountable. For example, the implementation of Alternative 2 would reduce stress and potential for collisions to T&E species. Also, the spread of weeds would be reduced, which would lessen the impacts to T&E species habitat. Therefore, the overall effects of this alternative would be positive for T&E species. However, T&E species and their habitat within the analysis area may continue to be impacted by OHV use due to the exceptions for administrative and permitted uses, although the likelihood for direct and indirect effects to occur is fairly low. Alternative 2 May Affect, but is not likely to adversely affect the bald eagle piping plover, black-footed ferret, gray wolf, grizzly bear, and Canada lynx. This alternative May Affect, but is not likely to jeopardize the continued existence of the mountain plover.

Sensitive Wildlife Species: As stated before, existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. Although potential impacts associated with motorized wheeled cross-country travel would be reduced or eliminated, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 3

Effects on wildlife from this alternative are similar to the No Action Alternative for a portion of the three-state area that would remain open to motorized wheeled cross-country travel. This area would include the Flathead, Kootenai and Bitterroot National Forests.

For the remainder of the analysis area impacts to wildlife would be similar to those discussed in Alternative 2.

Threatened and Endangered Wildlife Species: With this alternative, the direct and indirect effects described in the No Action Alternative would continue on the Kootenai, Flathead, and Bitterroot National Forests. On these three national forests, No Action Alternative May Affect but is not likely to adversely affect the bald eagle, piping plover,

black-footed ferret, grizzly bear, gray wolf, and Canada lynx. The No Action Alternative May Affect but is not likely to jeopardize the continued existence of the mountain plover

In the rest of the analysis area, the direct and indirect effects associated with motorized wheeled cross-country travel would be insignificant or discountable. For example, the implementation of Alternative 3 would reduce stress and potential for collisions to T&E species. Also, the spread of weeds would be reduced, which would lessen the impacts to T&E species habitat. Therefore, the overall effects of this alternative would be positive for T&E species. However, T&E species and their habitat within the analysis area may continue to be impacted by OHV use due to the exceptions for administrative and permitted uses, although the likelihood for direct and indirect effects to occur is fairly low. Alternative 3 May Affect, but is not likely to adversely affect the bald eagle, piping plover, black-footed ferret, gray wolf, grizzly bear, and Canada lynx. This alternative May Affect, but is not likely to jeopardize the continued existence of the mountain plover.

Sensitive Wildlife Species: Existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. Although potential impacts associated with motorized wheeled cross-country travel would be reduced or eliminated, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 4

This alternative would seasonally restrict motorized wheeled cross-country travel during the fall hunting season and during the late winter/spring period, which is a stressful time for some wildlife populations.

Much of the motorized wheeled cross-country travel is for the purpose of hunting and primarily occurs on two weekends, the opening of antelope season and the opening of the general big game season. Restricting vehicles to roads and trails during the fall would greatly reduce all associated impacts to wildlife for this period. Restricting areas to cross-country travel during the winter and spring time periods would lessen stress on wildlife during this critical period, and the impact from Alternative 4 would be similar to Alternative 2 as exceptions for leases and others are allowed.

For the other two time periods, summer and early winter, the effects on wildlife would be similar to the No Action

Alternative. This open period totals five months and does not include hunting season, the period when the greatest amount of motorized wheeled cross-country travel probably occurs. Due to this factor, the overall impacts to wildlife might be considerably less than that which is currently occurring.

Threatened and Endangered Wildlife Species: With this alternative, the direct and indirect effects described in the No Action Alternative would continue during the winter and summer months when motorized wheeled cross-country travel is allowed. The direct and indirect effects described in Alternative 2 would apply during the other times of the year. Therefore, Alternative 4 May Affect but is not likely to adversely affect the bald eagle, piping plover, black-footed ferret, grizzly bear, gray wolf, and Canada lynx. Alternative 4 May Affect but is not likely to jeopardize the continued existence of the mountain plover.

Sensitive Wildlife Species: Existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. Although potential impacts associated with motorized wheeled cross-country travel would be reduced or eliminated, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Alternative 5

The impacts of Alternative 5 are similar to Alternatives 1 and 2. An exception in Alternative 5 includes driving off-road 300 feet to a campsite. The campsite exception should hardly be a noticeable consequence to wildlife.

Threatened and Endangered Wildlife Species: The direct and indirect effects associated with motorized wheeled cross-country travel would be insignificant or discountable. For example, the implementation of Alternative 5 would reduce stress and potential for collisions to T&E species. Also, the spread of weeds would be reduced, which would lessen the impacts to T&E species habitat. Therefore, the overall effects of this alternative would be positive for T&E species. However, T&E species and their habitat within the analysis area may continue to be impacted by OHV use due to the exceptions for administrative and permitted uses, although the likelihood for direct and indirect effects to occur is fairly low. Alternative 5 May Affect, but is not likely to adversely affect the bald eagle, piping plover, black-footed ferret, gray wolf, grizzly bear, and Canada lynx. This alternative May Affect, but is not likely to jeopardize the continued existence of the mountain

plover. Effects for listed species are also discussed in Appendix C, Biological Assessment.

Sensitive Wildlife Species: As stated before, existing regulations, policies, and direction of the FS and BLM would be followed with the implementation of this alternative. Although potential impacts associated with motorized wheeled cross-country travel would be reduced or eliminated, specific impacts to sensitive species and habitats could potentially occur and cannot be determined without site-specific information. In the absence of additional information, the implementation of this alternative may impact individuals or habitat, but would not contribute to a trend toward federal listing or loss of viability to the population or species.

Cumulative Effects

Cumulative effects that are detrimental to wildlife and wildlife habitats are greatest under the existing management condition (No Action Alternative). If the present situation continues with no restriction on motorized wheeled cross-country travel on those lands without travel plans, along with increasing recreational pressures, added impact to wildlife and wildlife habitat would result. More user-created roads would be developed and more noxious weed areas would spring up. Over time, the areas in most need of travel restrictions would be addressed through site-specific planning.

The remaining alternatives are all positive actions for wildlife. They vary slightly in the degree of restriction placed on motorized wheeled cross-country travel, and thus, the degree of protection involved for wildlife and wildlife habitat. Alternatives 1, 2, and 5 provide the greatest positive effect, as they protect the greatest area over the longest portion of a year. Alternative 3 restricts a smaller area, and Alternative 4 is a seasonal restriction. Cumulatively, the public lands restricted to motorized wheeled cross-country travel would be added to other federal and state agency lands already closed or restricted to such travel in the three-state area. This effect would continue until site-specific planning takes place, and if such planning results in continued restriction, there would be no change in the positive cumulative effect for wildlife.

AQUATICS

AFFECTED ENVIRONMENT

Introduction

This reports provides an overview of aquatic resources on NFS and BLM lands in Montana, North Dakota and north-

western South Dakota. The purpose of the investigation is to understand how OHV traffic affects water quality and aquatic habitats with an emphasis on sensitive, threatened and endangered fishes.

The popularity of OHV's for recreational purposes has grown significantly in the last 20 years, yet little research has been performed to evaluate the effects of such vehicle activity on stream channel function, water quality, or aquatic habitats. Brown (1994) evaluated riverbed sedimentation caused by OHV's at river fords. Five major processes by which locally eroded sediment was added to the stream channel were identified: the creation of wheel ruts and concentration of surface runoff, the existence of tracks and exposed surfaces, the compaction and subsequent reduction in the infiltration rate of soils leading to increased surface runoff, backwash from the vehicle, and undercutting of banks by wave action. Not surprisingly, it was determined that as vehicle traffic increased so did sediment deposited in the stream. While this study did not evaluate the effects of introduced sediment on water quality or aquatic biota, numerous other studies have evaluated the effects of road-generated sediment on water quality and aquatic habitats.

Section 303(d) of the Clean Water Act requires that water bodies violating applicable state water quality standards be identified and placed on a 303(d) list. The purpose of this protocol is to provide a consistent framework to fulfill the obligation of the FS and BLM to restore water quality limited water bodies under their jurisdiction within a reasonable time frame.

Most pollutants on NFS and BLM lands originate from nonpoint sources. Nonpoint sources of pollution are described as agricultural crops, rangeland, construction sites, forestry operations, or other similar land uses. The 303(d) list (also called the threatened or impaired waters list) contains the Montana Department of Environmental Quality's best scientific assessment of the pollution problems and causes for 795 streams, rivers and lakes across Montana. The cumulative erosion resulting from a dispersed, expanding, and unmaintained motorized trail system would be considered a nonpoint source of pollution. Many of the streams residing in the river basins described below are identified on the 303(d) list. The Montana Department of Environmental Quality describes an exhaustive listing of impaired water bodies (1998).

The types of resource effects reported by resource specialists were consistent with those reported in a 1995 General Accounting Office Report (Information on the Use and Impact of Off-Highway Vehicles). The report documents the problems, enforcement, and corrective actions associated with eight locations of intensive OHV use on NFS and

BLM lands in several western states. In this report, four of the case areas described degraded riparian areas, vehicle travel along streambeds, and the eroded soils and degraded riparian vegetation associated with vehicles climbing steep stream banks. The Montana Department of Environmental Quality (1998) identified probable causes of pollution for each stream listed and categorized them as threatened or impaired (303(d)). Common causes of pollution for streams on NFS or BLM lands are habitat alterations and siltation. While numerous sources often exist for such pollution, the degraded conditions attributed to OHV use in riparian areas and stream bottoms are also likely contributors of such pollution on listed streams.

Rocky Mountain Region

Clark Fork and Kootenai River Basins: Within the Clark Fork and Kootenai River basins, public lands provide diverse riparian and aquatic habitats for a variety of native fish species, including bull trout, westslope cutthroat and redband trout, northern squawfish, sculpins, dace, sucker, mountain whitefish, white sturgeon and other lesser known species. Presently, two species in these basins in Montana, the white sturgeon and bull trout, are listed as endangered and threatened respectively, under the Endangered Species Act. Also found in these waters are many introduced fish, including largemouth and smallmouth bass, yellow perch, brook trout, bluegill, northern pike, tench, and carp (USDA 1995). Several species of resident native fish, including the ling, torrent sculpin, westslope cutthroat trout and interior redband trout, are listed as "Sensitive Species" by the FS Northern Region. The westslope cutthroat trout has been petitioned for listing under the Endangered Species Act.

Over the last 120 years, native resident fish habitat has been adversely affected by human population growth and factors associated with that growth (USDA 1995). The decline of the Kootenai River white sturgeon is primarily a result of impoundments and exploitation (USDI 1999c). For salmonid species, past and continuing management practices are causing erosion and sedimentation in various forms and by varying degrees throughout the analysis area. Mass erosion has accelerated in many locations where instability is a common natural feature of the landscape. Reduction of tree root holding capacity, increases in subsurface water, and undercutting of unstable slopes have resulted in significant sources of downstream sedimentation and local channel damage (USDA 1995).

Local extremes in water temperature have significantly increased by a reduction of shading from bank and other vegetation, flattening of bank angles, and reduction of overall water depth in the summer months from sedimentation as well as water diversion. Temperature effects tend to be localized in the mountainous areas, but in the lower

gradient and nontimbered stream reaches, temperature change can be geographically extensive (USDA 1995).

Channel condition and channel stability have been and continue to be affected, especially in areas of extensive or long-term management. Livestock grazing, road construction, logging practices, and recreational use in some areas have destabilized stream banks resulting in bank erosion, loss of cover and shading, widening and filling of channels, and accelerated lateral migration. Recently developed and implemented best management practices, forest plans, and land use plans have reduced the frequency with which new stream destabilization occurs, however, existing channel condition and stability problems are not expected to be significantly corrected if present trends continue (USDA 1995).

Quigley et al. (1996) categorized the aquatic integrity of the 16 subbasins in Montana. A basin with high aquatic integrity is defined as a basin with a mosaic of well-connected, high quality water and habitats that support a diverse assemblage of native and desired nonnative species, the full expression of potential life histories and dispersal mechanisms, and the genetic diversity necessary for long-term persistence and adaptation in a variable environment. Watersheds that are currently aquatic strongholds occur in areas of low road density. Quigley et al. (1996) found that the higher the road density, the lower the proportion of subwatersheds that support strong populations of key salmonids. Only two subbasins in Montana were identified as having high aquatic integrity: the South Fork of the Flathead River and Rock Creek. Both the hydrologic and riparian ratings recognize road densities and riparian disturbance as critical criteria for assessing integrity.

Because much of the NFS and BLM land in the Clark Fork and Kootenai River basins is steep, highly dissected and heavily vegetated, few opportunities for motorized wheeled cross-country travel exist with current OHV technology. However, some problems with motorized wheeled cross-country travel exist. Increasing use of OHV's for motorized wheeled cross-country travel is resulting in erosion of alpine meadows in the Slate Creek area of the Little Blackfoot drainage (A. Harper, pers. comm. 1999). Several forests have indicated they have site-specific locations where undesirable effects have occurred and they are addressing these areas through local travel planning.

Upper Missouri River: The Missouri River basin, which is tributary to the Mississippi River, drains much of southwestern and northern Montana east of the continental divide. The basin drains roughly 92,000 square miles, including roughly 5,000 square miles in southern Alberta and Saskatchewan, at the North Dakota state line. The Missouri River basin occupies about 60% of the State of

Montana. For purposes of this assessment, the 23,292 square miles from the headwaters to the confluence with the Sun River comprise the upper Missouri River. The three headwater streams of the Missouri River emerge from their origins in Yellowstone National Park and five mountain ranges in southwestern Montana, flow through semi-arid valleys of sagebrush and grass, and converge near Three Forks. The Jefferson, Madison, and Gallatin Rivers drain a portion of the continental divide and the Madison, Spanish Peaks, Gallatin, Tobacco Root, and Gravelly Mountain Ranges. Many peaks within these ranges reach above 10,000 feet, with valleys in these drainages occurring at an average elevation of about 4,500 feet (Graham and Decker-Hess 1988). The Missouri River begins where the Jefferson, Madison, and Gallatin converge near Three Forks. During the 180-mile journey to the Sun River, the Missouri is dammed four times at Toston, Canyon Ferry, Holter, and Hauser Reservoirs.

Sixty-two stream reaches on the Gallatin, Madison, and Jefferson Rivers and their major tributaries are low-flow problem areas (Montana DNRC 1991). The majority of these stream reaches are downstream from NFS lands. Low-flow problem areas have been identified on 37 stream reaches between Three Forks and the Missouri River's confluence with the Sun River. Irrigation causes most of the seasonal low-flow conditions. Irrigation use and geological conditions in Dry Creek, Confederate Gulch, and Avalanche Creek on the east side of the Missouri River and Canyon Ferry Reservoir cause the most severe low-flow conditions (Montana DNRC 1991).

The FS and BLM consider the fluvial arctic grayling and the westslope cutthroat trout as species of special concern. The arctic grayling in Montana once had a native range consisting of streams in the upper Missouri River basin above Great Falls. Presently, fluvial grayling are found only in the Big Hole River. In 1991, the FWS was petitioned to list the fluvial arctic grayling as Endangered, under the Endangered Species Act. Currently, the Big Hole grayling are classified as category 1 candidate species, defined as "taxa for which the FWS has substantial information to support the biological appropriateness of proposing to list the species as endangered or threatened" (USDA 1997).

Westslope cutthroat trout once had a native range including both sides of the continental divide, the upper Missouri, upper and middle Columbia River, and south Saskatchewan basins. Presently, westslope cutthroat trout are found in less than 5% of their historic range in the upper Missouri River basin (Shepard et al. 1997). Factors leading to declines of westslope cutthroat trout include introductions of nonnative fishes and habitat alterations caused by land use and water use practices (Shepard et al. 1997). Montana's Department of Fish, Wildlife and Parks recently (1996) changed

angling regulations for westslope cutthroat trout in streams and rivers in the upper Missouri basin to catch and release, to lessen potential population losses caused by angling. Remaining populations within the upper Missouri basin are now restricted to isolated headwater habitats. Many of these habitats have been impacted by land and water management activities and nonnative salmonids (Shepard et al. 1997).

Land use practices, including livestock grazing, timber harvest, streamside roads, and irrigation diversions, have adversely impacted stream channel stability and the associated aquatic habitats necessary for westslope cutthroat trout (USDA 1997 and Shepard et al. 1997) in the upper Missouri River basin. Many locations of erosion associated with OHV use on roads or trails have been identified on national forests east of the continental divide. Discussions with aquatic resource specialists suggest that motorized wheeled cross-country travel occurs throughout the region. Areas most notably mentioned were: the Whitetail-Pipestone area on the Beaverhead-Deerlodge National Forest, areas throughout the Big Belt Mountains, the Little Belt Mountains (Tenderfoot Creek), the Judith Mountains, and the Big Snowy Mountains. Effects included streamside trails that had moved into the stream itself, numerous stream crossings, and OHV riders using ephemeral channels for trails and climbing stream banks. These activities were resulting in eroding streambanks, compaction of riparian soils, and a loss of riparian vegetation. Most resource specialists thought that these effects and activities were increasing, however, these effects were highly variable and often localized to a specific stream or reach of stream.

Upper Yellowstone River: The Yellowstone River near Livingston drains approximately 3551 square miles (USDI 1997b). The Yellowstone is one of the last major free-flowing rivers in the contiguous 48 states. It originates in northwestern Wyoming and flows into Yellowstone Lake in Yellowstone National Park before entering Montana at Gardiner. For the purposes of this discussion, the upper Yellowstone River is considered that part of the drainage above Big Timber, Montana. From the park boundary the river flows north through the Paradise Valley, bordered on the east by the Absaroka Mountains and on the west by the Gallatin Range (Graham et al. 1988). Diversions to irrigate approximately 24,000 acres occur upstream from Livingston (USDI 1997b). Average annual discharge at Livingston is 3,764 cubic feet/second (USDI 1997b).

At the time of early European settlement of Montana, Yellowstone cutthroat trout were the only native trout within the Yellowstone River drainage. An estimated 4,260 miles of occupied habitat and as many as six lakes support cutthroat trout. At present, an estimated 428 miles of stream support 38 genetically pure Yellowstone cutthroat trout

populations. Most current populations are at risk from either hybridization, demographic or stochastic influences. According to Montana fish stocking records, 31 of the 38 streams and/or watersheds which support current populations have been stocked with at least one of the following fish species: rainbow trout, brook trout, brown trout, Yellowstone cutthroat trout, or other trout of unidentified speciation (May 1998).

The population viability of 22 out of the 38 populations was at risk due to past and present management activities. However, cross-country travel of OHV's on NFS and BLM lands in the upper Yellowstone River basin is minimal and the effects of motorized wheeled cross-country travel are site-specific (B. May, pers. comm. 1999). Topography and vegetation severely limit cross-country travel of OHV's on NFS lands, thus it appears that most users stay on roads and trails. Most OHV crossings are associated with trails. This type of activity is degrading the net quality of streams (B. May, pers. comm. 1999). It is difficult to tie infrequent trail crossings to cumulative effects. In the Yellowstone Cutthroat Trout Status report (1998), recreation was seldom identified as a land use that was compromising the viability or habitat of Yellowstone cutthroat trout.

Great Plains Region

This region includes the Great Plains east from the Rocky Mountains to the western boundary of the Red River watershed in North Dakota, or approximately 98 degrees longitude. This area is drained by two major river systems, the Missouri River, which is tributary to the Mississippi River, and the Red and Souris Rivers, which are tributaries to Hudson Bay. The Missouri River is the dominant hydrologic feature of the northern Great Plains. This region includes the Yellowstone drainage below Big Timber, Montana. Three of the four national grasslands administered by the FS Northern Region are in this region. The Little Missouri and Cedar River National Grasslands are in North Dakota, along with about 60,000 acres of BLM lands. The majority of BLM lands are located in Bowman and Dunn counties. The Grand River National Grassland is located in northwestern South Dakota, along with approximately 279,000 acres of BLM lands.

Snowpack ranges from 10 to 40 inches. There are more perennial streams in the eastern portion due to greater rainfall combined with snowmelt. Perennial streams in the western portion flow from mountains or are fed by groundwater. In some places, infiltration of precipitation to shallow groundwater is the only source of stream flow (Johnson 1988).

The aquatic resource effects associated with OHV use throughout the area appear to be minimal. Most of the

region is quite arid. On the Grand River National Grassland of South Dakota, most OHV use is by hunters and permittees. No erosion resulting from motorized wheeled cross-country travel by OHV's was noted on the grassland. On BLM lands in South Dakota, motorized wheeled cross-country travel did not appear to cause erosion or compaction of riparian soils, however, localized erosion on hillslopes and ridgetops was occurring as result of OHV travel (C. Berdan, pers. comm. 1999). On the Little Missouri National Grassland, motorized wheeled cross-country travel is extensive, resulting in rilling and gulying on hillslopes and ridges (S. Thompson, pers. comm. 1999). Aquatic resource effects from this activity are localized and include erosion in valley bottoms (S. Rinehart, pers. comm. 1999).

The effects of motorized wheeled cross-country travel in Montana are more variable. Public land in this region of Montana is administered mostly by the BLM. The largest aggregation of land administered by the BLM is near the Fort Peck Dam in northeastern Montana. Because the area is quite arid and OHV use is very dispersed, few effects from motorized wheeled cross-country travel are reported (R. Neumiller, pers. comm. 1999). The high clay content of local soils makes cross-country travel of OHV's during wet periods almost impossible over much of the area. The clay soils shrink and swell between periods of wet and dry. Thus, soil compaction during drier periods is often short lived (R. Neumiller, pers. comm. 1999). No documented occurrences of riparian erosion or stream channel degradation exist for the BLM land administered out the Great Falls Field Office (T. Day, pers. comm. 1999). There is relatively little motorized wheeled cross-country travel on the Beartooth Ranger District of the Custer National Forest (P. Pierson, pers. comm. 1999). While there is considerable use of OHV's in the Pryor Mountains, most travel is limited to roads and trails. Other observations from the Custer National Forest indicate that many old, unsurfaced travel routes have developed a history of OHV use and contribute sediment to streams as a result of use under wet conditions (USDA 1999b).

Within this region, the pallid sturgeon is the only fish species on the T&E species list. In 1990, the FWS listed the pallid sturgeon as endangered. Pallid sturgeon remains one of the most rare fishes of the Missouri and Mississippi River basins (Dryer and Sandoval 1993). The historic range of the pallid sturgeon encompassed the middle and lower Mississippi River, the Missouri River, and the lower reaches of the Platte, Kansas, and Yellowstone Rivers. Although rare, the pallid sturgeon is widely distributed in the Missouri River and in the Mississippi River downstream from the Missouri River (Dryer and Sandoval 1993). Since 1980, reports of the most frequent occurrences of pallid sturgeon within the analysis area are from the Missouri River between the Marias River and Ft. Peck Reservoir in Montana; between

Ft. Peck Dam and Lake Sakakawea (near Williston, North Dakota); within the lower 70 miles of the Yellowstone River to downstream of Fallon, Montana; and in the headwaters of Lake Sharpe in South Dakota (Dryer and Sandoval 1993).

Both the sicklefin chub and the sturgeon chub are considered candidate species, by the FWS, for listing on the T&E species list. Historically, the sturgeon chub and sicklefin chub were widespread throughout the main stem Missouri River and its larger tributaries, and the middle Mississippi River downstream of the confluence with the Missouri River (USDI 1999b). The primary factors associated with the decline of sturgeon and sicklefin chub are the development and continued operation of water resource projects within the Missouri River basin, including dams, reservoirs, river training structures and levees for navigation and flood control, and water diversion projects (USDI 1999a). The past and continuing destruction and alteration of the big river functions and habitat once provided by the Missouri and Mississippi Rivers is believed to be the primary cause of declines in reproduction, growth, and survival of sturgeon chub, sicklefin chub, and other big-river fish such as the endangered pallid sturgeon. Because of the great size of the rivers that these chubs inhabit, and the apparent minimal effects of OHV cross-country travel reported across the region, it is unlikely that cross-country travel of OHV's, at their current level, would further compromise the status of the sturgeon chub, sicklefin chub and pallid sturgeon. Paddlefish and the blue sucker (BLM species of special concern) have also been largely affected by impoundments. Other species of special concern are the northern redbelly dace, pearl dace and the shortnose gar.

North American Prairie Region

The region begins at the western boundary of the Red River watershed, or approximately 98 degrees longitude, and continues to the eastern border of North Dakota and South Dakota. Within this region there are no fish species listed as threatened or endangered by the FWS. The Sheyenne National Grassland is the only NFS land in the prairie division and is located in the southeastern corner of North Dakota. Much of the grassland is ponds, wetlands, and seasonal wetlands (B. Stotts, pers. comm. 1999). The north end of the grassland is flat and borders a short segment of the Sheyenne River. OHV travel on the Sheyenne National Grassland is concentrated on the hummocks and dunes of the central and southern part of the grassland. Although erosion resulting from this type of use is common, it is neither near nor connected to any riverine environments. Because the north end of the grassland is relatively flat, it does not offer the same attraction as the swales and dunes in the central and southern part of the grassland. Little motorized wheeled cross-country travel of OHV's occurs

on land near the Sheyenne River (B. Stotts, pers. comm. 1999).

Species Descriptions and Habitat Requirements

Descriptions are provided for listed species and only key sensitive species or species of special concern because of the broad programmatic nature of this document. Key sensitive species are those in which motorized wheeled cross-country travel has potential for impact.

White sturgeon: This endangered species historically occurred on the Pacific coast from the Aleutian Islands to central California. It occurs in the Columbia River system and its major tributary, the Kootenai River. They are generally long-lived, with females living from 34 to 70 years. Females normally require a longer period to mature than males, with females spawning between 15 to 25 years of age. White sturgeon are broadcast spawners in large rivers during peak flows from April through July. The Kootenai River population is one of 18 landlocked populations known to occur in western North America. White sturgeon is mainly a bottom feeder and feeds on mostly fishes and a wide variety of invertebrates (Scott and Crossman 1973). The decline of the white sturgeon is primarily a result of impoundments and exploitation (USDI 1999c).

Pallid sturgeon: This endangered species is well adapted for life at the bottom of swift, large, turbid and free flowing rivers. Pallid sturgeon evolved in the diverse environments of the Missouri and Mississippi Rivers. Floodplains, backwaters, chutes, sloughs, islands, sandbars, and main channel waters formed the large-river ecosystem that provided macrohabitat requirements for pallid sturgeon and other native large-river fish (Dryer and Sandoval 1993). These habitats within the analysis area have been drastically altered. "On the mainstem of the Missouri River, approximately 36% of riverine habitat within the pallid sturgeon's range was eliminated by construction of six massive earthen dams between 1926 and 1952 and another 40% has been channelized. The remaining 24% has been altered due to changes in water flows caused by dam operations" (Dryer and Sandoval 1993).

The range of water depths where pallid sturgeon were frequently found in South Dakota is 7-20 feet. In Montana, pallid sturgeon were captured from depths that ranged from 3.9-12.1 feet, but they were captured in deeper waters during the winter (Dryer and Sandoval 1993). During late summer in North Dakota, pallid sturgeon were captured at depth that ranged from 6.9-24.9 feet (Dryer and Sandoval 1993). Because of the great size of the rivers that pallid sturgeons inhabit, the typical water depths in which they

have been found, and the apparent minimal effects of OHV cross-country travel reported across the region, it is unlikely that motorized wheeled cross-country travel, at the current levels, would further compromise the status of the pallid sturgeon.

Bull trout: This is a threatened species within the Columbia River basin. The following discussion of bull trout habitat requirements is taken from Montana Bull Trout Scientific Group (1998). The majority of migratory bull trout spawning in Montana occurs in a small percentage of the total stream habitat available. Spawning takes place between late August and early November, principally in third and fourth order streams. Spawning adults use low gradient areas (less than 2%) of gravel/cobble substrate with water depths between 0.1 and 0.6 m and velocities from 0.1 to 0.6 m/s. Proximity of cover for adult fish before and during spawning is an important habitat component. Spawning tends to be concentrated in reaches influenced by groundwater where temperature and flow conditions may be more stable. The relationship between groundwater exchange and migratory bull trout spawning requires more investigation. Spawning habitat requirements of resident bull trout are poorly documented.

Successful incubation of bull trout embryos requires water temperatures below 8 degrees C, less than 35-40% of sediments smaller than 6.35 mm in diameter, and high gravel permeability. Eggs are deposited as deep as 25.0 cm below the streambed surface and the incubation period varies depending on water temperature. Spawning adults alter streambed characteristics during redd construction to improve survival of embryos, but conditions in redds often degrade during the incubation period. Mortality of eggs or fry can be caused by scouring during high flows, freezing during low flows, superimposition of redds, or deposition of fine sediments or organic materials. A significant inverse relationship exists between the percentage of fine sediment in the incubation environment and bull trout survival to emergence. Entombment appeared to be the largest mortality factor in incubation studies in the Flathead drainage. Groundwater influence plays a large role in embryo development and survival by mitigating mortality factors.

Rearing habitat requirements for juvenile bull trout include cold summer water temperatures (15 degrees C) provided by sufficient surface and groundwater flows. Warmer temperatures are associated with lower bull trout densities and can increase the risk of invasion by other species that could displace, compete with, or prey on juvenile bull trout. Juvenile bull trout are generally benthic foragers, rarely stray from cover, and they prefer complex forms of cover. High sediment levels and embeddedness can result in decreased rearing densities. Unembedded cobble/rubble substrate is preferred for cover and feeding and also pro-

vides invertebrate production. Highly variable streamflow, reduction in large woody debris, bedload movement, and other forms of channel instability can limit the distribution and abundance of juvenile bull trout. Habitat characteristics that are important for juvenile bull trout of migratory populations are also important for stream resident subadults and adults. However, stream resident adults are more strongly associated with deep pool habitats than are migratory juveniles.

Both migratory and stream-resident bull trout move in response to developmental and seasonal habitat requirements. Migratory individuals can move great distances (up to 250 km) among lakes, rivers, and tributary streams in response to spawning, rearing, and adult habitat needs. Stream-resident bull trout migrate within tributary stream networks for spawning purposes, as well as in response to changes in seasonal habitat requirements and conditions. Open migratory corridors, both within and among tributary streams, larger rivers, and lake systems are critical for maintaining bull trout populations.

Interior redband trout: This sensitive species exhibits a wide variety of life history strategies. Anadromous stocks of redband (steelhead) trout historically migrated up to 1,600 kilometers to the middle and upper Columbia River drainage (Behnke 1992). Many of these stocks are now extinct due to dams impeding upstream migration. The gerrard strain of rainbow trout (kamloops) of Kootenay Lake, British Columbia, Canada, represents an adfluvial form, which attains a large body size due to their piscivorous diet of kokanee salmon. Kamloops redband trout rear in Kootenay Lake and reportedly spawn in Kootenai River tributaries in Montana (Huston 1998). Fluvial stocks occupy larger rivers and spawn in smaller tributaries. Resident populations inhabit smaller tributaries and headwater areas for their entire lives.

Behnke (1992) differentiates the redband-rainbow-golden-steelhead trout complex into six "subspecies," one of which is the Columbia/Frazier redband, including the Kootenai River redband.

The interior redband range includes this area of the Kootenai River (and tributaries including the entire Yaak River drainage) in Montana. The Kootenai River redband trout in Montana represent the furthest inland penetration of redband trout in the Columbia River basin. Historically, the interior redband trout occupied much of the Kootenai River system below Kootenai Falls, including the Yaak River. Now, only a few remnant populations exist due to habitat degradation and planting of nonnative stocks of coastal rainbow trout. Genetic introgression with these nonnative stocks is thought to be the principle cause of reductions in distribution and abundance throughout its historic range (Behnke 1992).

Much of the controversy surrounding the redband is over the genetic integrity of remaining populations, and the imminent danger of hybridization with nonnative, hatchery propagated fish.

Westslope cutthroat trout and Yellowstone cutthroat trout: Westslope and Yellowstone cutthroat trout, both sensitive species, have two distinctive life forms: migratory and resident. Migratory life forms are either fish that spend most of their adult lives in lakes (adfluvial) or rivers (fluvial) and migrate into tributaries to spawn. Resident cutthroat trout are fish that generally spend their entire lives in the tributaries of which they were reared, and are usually much smaller in size than their migratory counterparts. Spawning takes place from March to early July with water temperature near 10°C (McIntyre and Rieman 1995). Westslope cutthroat trout begin to sexually mature at age three and usually are spawning by ages four and five (McIntyre and Rieman 1995). Spawning adults can be as small as 15 cm, with females containing as few as 100 eggs (Meehan and Bjornn 1991). Fry will emerge from spawning gravels from June to mid-July and will usually stay within their natal streams from one to four years, if they are the migratory form.

Montana arctic grayling: The Montana arctic grayling is a sensitive species. Fluvial grayling in the Big Hole River undergo extensive upstream and downstream migrations (Kaya 1992). While migratory patterns differ among streams, a common pattern is movement upstream to spawning and summering areas and downstream to wintering areas with large volumes and deep pools (Reynolds 1989, Shepard and Oswald 1989). Big Hole River grayling have been observed to migrate as far 50 miles. It is not known whether grayling in other Montana streams are also migratory (Kaya 1992).

Grayling in Montana occupy habitats with low gradients of up to 20 feet per mile, water velocities of 1 to 2 ft/s, water depths of 1 to 3 ft, spawning substrate of coarse sand to fine gravel, and with beds of macrophyte vegetation being common (Vincent 1962). Liknes (1981) found the greatest number of grayling on the Big Hole River in a section near Wisdom that had a gradient of 0.3% and a mean velocity of 0.7 ft/s.

Recent observations have indicated that an important component of fluvial grayling habitat is the presence of pools. Pools provide deep, low-velocity habitat preferred by grayling (Kaya 1992). Electrofishing surveys have indicated that fluvial grayling in Montana and Alaska spend most time in pools rather than riffles (Hubert et al. 1985, Reynolds 1989, Shepard and Oswald 1989). Pools in the Big Hole River are defined by Liknes (1981) as areas with maximum depths greater than 0.5 m, slow water velocities, smooth water velocities, and smooth surfaces.

ENVIRONMENTAL CONSEQUENCES

Introduction

The impacts of roads and trails on aquatic resources have been documented in the affected environment and are considered part of the existing condition. In all alternatives, site-specific analyses would be completed in subsequent planning at the local level to determine site-specific mitigation needed to maintain or improve aquatic conditions where necessary. The intensity of motorized wheeled cross-country use on NFS and BLM lands within the analysis area is expected to increase. This analysis evaluates the relative probability, associated with each alternative, of further degradation of riparian areas and aquatic habitats, and the vulnerability of sensitive salmonids to increased angling pressure and poaching on NFS and BLM lands within the analysis area.

Effects Common To All Alternatives

None of the alternatives restrict use where OHV user-created roads and trails have been established in riparian areas, areas of unusual erosivity, or areas of critical aquatic habitats. However, the agencies have the authority to immediately close a road, trail, or area when considerable adverse effects are occurring (36 CFR 295.5 and 43 CFR 8341.2 and 8364.1). Because OHV use is not evenly distributed across NFS and BLM lands in the analysis area, the effects associated with this use are concentrated in intensively used areas. The amount of sediment routed to streams and rivers in the analysis area is highly variable and dependent upon numerous factors that cannot be easily quantified at this level.

Sensitive Fish: This proposal is programmatic in nature; therefore, the discussion of effects will be general and qualitative rather than quantitative. The following assessment does not consider, because of the programmatic nature of this evaluation and lack of site-specific information, individual species ecological or biological requirements. Individual species requirements would be addressed in site-specific project analyses. Potential site-specific effects of implementing any alternative, on any given species or habitat, will be evaluated in a second level, site-specific project analysis.

The criteria for evaluating potential effects to sensitive species are: 1) would implementation of the alternatives result in a loss of viability or distribution throughout the analysis area of the sensitive species; or 2) would implementation of the alternatives move sensitive species toward federal listing under the Endangered Species Act? An assumption made here is that all regulations, policies, and

direction of the FS and BLM would be followed with the implementation of any alternative; therefore, none of the alternatives, if fully implemented, would result in loss of viability of these species or move toward federal listing.

No Action Alternative

The No Action Alternative is the least restrictive for motorized wheeled cross-country use. Motorized wheeled cross-country use of OHV's in areas of intensive use would likely continue to increase, as would the negative effects of such use in riparian areas. OHV user-created roads would incrementally increase road densities. Due to topography and vegetation, this process would likely occur more rapidly in the arid and less steep terrain east of the continental divide. Many of the effects associated with water and water resources are often localized in arid geographic settings where little fish habitat is available, such as the many isolated and fragmented lands administered by the BLM. Further localized degradation of fish habitat by motorized wheeled cross-country travel may occur. This would be particularly true for lands around the Dillon Field Office of the BLM, the Big Belt Mountains, Little Belt Mountains, the Snowies, areas of eastern Montana, the Little Missouri National Grassland, and areas of the Little Blackfoot drainage. West of the divide, widespread motorized wheeled cross-country use is less likely due to topography and vegetation. User-created roads and trails generally fail to meet the riparian and road management objectives outlined in the Inland Native Fish Strategy (USDA 1995). Implementation of this alternative would still allow wheeled motorized access to riparian areas and stream channels. Erosion and riparian degradation would likely continue to occur with the No Action Alternative. The effects would likely be more pronounced east of the continental divide.

The Montana Department of Environmental Quality (1998) identified probable causes of pollution for each stream listed as threatened or impaired (303(d)). Common causes of pollution for streams on NFS or BLM lands are habitat alterations and siltation. While numerous sources often exist for such pollution, the degraded conditions attributed to OHV use in riparian areas and stream bottoms are also likely contributors of such pollution on listed streams. Because sediment and aquatic habitat alterations associated with OHV traffic would likely continue to increase, it is probable that water quality on some of the 303 (d) streams would, in some cases, further deteriorate. These effects would likely be most pronounced east of the continental divide.

It is conceivable that isolated populations of westslope cutthroat trout, bull trout, redband trout, torrent sculpin, and Yellowstone cutthroat trout could become more vulnerable to angling and poaching as more people utilize cross-

country motorized travel to access streams that were formerly accessible only by nonmotorized travel. It is also conceivable that as the number of trail-stream crossings increase, salmonid redds could be at greater risk from disturbance at stream fords. This scenario is more likely as OHV technology continues to improve, producing machines more capable of accessing difficult terrain. The probability of this occurring is greatest with the No Action Alternative. Salmonid habitat and habitat for torrent sculpin may be compromised in the future as technology improves on the west side of the divide.

The primary factors associated with the decline of sturgeon and sicklefin chub are the development of water resource projects within the Missouri River basin during the 1950's and 1960's, the continued maintenance and operation of these projects as well as the construction and operation of main stem and tributary dams and reservoirs, construction of river training structures and levees for navigation and flood control, respectively, and water diversion projects have contributed to the past and present destruction and modification of sturgeon chub and sicklefin chub habitat (USDI 1999b). The past and continuing destruction and alteration of the big river functions and habitat once provided by the Missouri and Mississippi Rivers is believed to be the primary cause of declines in reproduction, growth, and survival of sturgeon chub, sicklefin chub, and other big-river fish such as the endangered pallid sturgeon. The decline of the Kootenai River white sturgeon is primarily a result of impoundments and exploitation (USDI 1999c).

Because of the great size of the rivers that these chubs and sturgeons inhabit, and the apparent minimal effects of OHV cross-country travel reported across the region, it is unlikely that cross-country travel of OHV's, at their current level, would further compromise the status of the white sturgeon, pallid sturgeon, sturgeon chub and sicklefin chub.

The conclusion of effects for listed and sensitive species are as follows:

Bull trout	May affect, not likely to adversely affect
Pallid sturgeon	No effect
White sturgeon	No effect

Alternatives 1, 2 and 5

Effects of Alternatives 1, 2 and 5 are similar with respect to streams and riparian habitats. These alternatives would prohibit motorized wheeled cross-country travel yearlong with a few exceptions. Motorized traffic would be limited to roads and trails. Any of these alternatives would provide the greatest reduction in stream bank erosion, compaction

of riparian soils, and loss of riparian vegetation. Habitat alterations and sediment generated by OHV use are not expected to spread to new areas. These alternatives provide a greater reduction in sediment and habitat alterations as sources of impairment to 303 (d) streams. By reducing motorized wheeled cross-country access to remote and isolated salmonid populations, Alternatives 1, 2, and 5 would reduce the risk in losses of sensitive fishes. This risk reduction would be most pronounced east of the continental divide for westslope cutthroat trout and Yellowstone cutthroat trout. Effects as a result of the exceptions under Alternatives 2 and 5 are insignificant and discountable and are not likely to affect streams and riparian habitats, nor increase the vulnerability of isolated fish populations to further losses.

The conclusion of effects for listed and sensitive species are as follows:

Bull trout	May affect, not likely to adversely affect
Pallid sturgeon	No effect
White sturgeon	No effect

Alternative 3

Effects under this alternative would be similar to the effects described under Alternative 2 in areas where motorized wheeled cross-country travel is restricted yearlong. No change would occur in motorized wheeled cross-country travel on the Kootenai, Flathead and Bitterroot National Forests. East of the continental divide, effects would be the same as those discussed for Alternative 2. Topography and vegetation limit widespread cross-country use of OHV's in the open areas on the Kootenai, Flathead and Bitterroot National Forests. Widespread degradation of streams and riparian habitats is unlikely as a result of motorized wheeled cross-country traffic but may have localized impacts. Unless addressed in site-specific planning, specific areas of erosion, such as those in the Little Blackfoot drainage, would likely continue to be aggravated by motorized wheeled cross-country travel. Because sediment and aquatic habitat alterations associated with OHV traffic would likely continue to increase, water quality on some of the 303 (d) streams may further deteriorate.

Effects to westslope and Yellowstone cutthroat trout would be similar to those in Alternatives 1, 2 and 5 because access would be limited to nonmotorized travel in many areas where these species occur. Isolated populations of westslope cutthroat trout, bull trout, and redband trout west of the continental divide could become more vulnerable to angling pressure and poaching as more people utilize motorized wheeled cross-country travel to access isolated streams.

Given the topography and vegetation over most of western Montana, this risk is relatively small over most of the region.

The conclusion of effects for listed and sensitive species are as follows:

Bull trout	May affect, not likely to adversely affect
Pallid sturgeon	No effect
White sturgeon	No effect

Alternative 4

Alternative 4 would change travel direction across the entire analysis area. All open areas would be changed to a seasonal restricted/limited designation, and all seasonally restricted/limited areas would be changed to a new seasonal designation. The new seasonal designation would allow motorized wheeled cross-country travel between June 15 and August 31, and between December 2 and February 15. The same exceptions for cross-country OHV travel associated with Alternatives 2 and 3 would apply to Alternative 4 outside of the specified dates.

Because the topography and vegetation make widespread motorized wheeled cross-country use west of the continental divide unlikely with current technology, the effects of Alternative 4 would not differ substantially from those associated with the No-Action Alternative or Alternative 3. Compared with the No Action Alternative, Alternative 4 would reduce the number of days that motorized wheeled cross-country travel could occur east of the continental divide. Motorized wheeled cross-country travel under Alternative 4 may result in some stream bank erosion, compaction of riparian soils, and loss of riparian vegetation in Montana, North Dakota and South Dakota. Water quality on some of the 303 (d) streams may further deteriorate because sediment and aquatic habitat alterations associated with OHV traffic would likely continue. Motorized wheeled cross-country travel may result in a greater risk for angling pressure and poaching of isolated populations of westslope and Yellowstone cutthroat in Montana. Overall, the effects of this alternative would be less than those associated with the No Action Alternative because there are fewer days during which this activity could occur. The number of potential stream fords could also be reduced because motorized wheeled cross-country travel would be restricted during the fall months. This seasonal restriction could also reduce the risk of OHV's driving over the redds of fall spawning fish such as the bull trout. East of the continental divide, the effects of this alternative would likely fall between those identified for the other action alternatives

and the No Action Alternative. The effects on white sturgeon, pallid sturgeon, sicklefin chub and sturgeon chub are the same as the No Action Alternative.

The conclusion of effects for listed and sensitive species are as follows:

Bull trout	May affect, not likely to adversely affect
Pallid sturgeon	No effect
White sturgeon	No effect

Cumulative Effects

The greatest cumulative effects exist in areas where existing road densities are contributing to the degradation of aquatic habitat and watershed resources. These impacts occur mostly in the Rocky Mountain region of the analysis area and are considered the baseline conditions. If motorized wheeled cross-country travel continues and use increases as projected, it would continue to cumulatively impact the aquatic and watershed resources. User-created roads and trails can be more impactful than designed roads and trails, since segments are created and unmitigated in sensitive areas like riparian areas or on sensitive and erodable soils. The prohibition of motorized wheeled cross-country travel would maintain conditions in their current condition in the short term until site-specific travel planning is completed. Alternatives 1, 2 and 5 would provide the best opportunities to restore aquatic habitat and watershed resources in the long term, because areas would be prioritized for site-specific planning and restoration would be planned.

Comparison of Alternatives

The No Action Alternative would provide no risk reduction for further degradation of aquatic resources. This is the least desirable alternative with respect to water quality and fisheries. Alternatives 1, 2 and 5 would provide the greatest reduction in risk for further degradation of aquatic resources by cross-country OHV use across the entire analysis area. Alternatives 1, 2 and 5 are the most desirable with respect to aquatic resources. Alternative 3 would provide the same benefits as Alternatives 1, 2 and 5 east of the continental divide. Alternative 3 is identical to the No Action Alternative with respect to aquatic resource effects to lands west of the continental divide. The effects associated with Alternative 4 would likely fall between those identified for the No Action Alternative and Alternatives 1, 2 and 5.

SOILS

AFFECTED ENVIRONMENT

Soils are the fundamental natural resource on the landscape. Each soil is a three-dimensional body with its own unique physical and chemical properties. Soils result from the interaction of climate and living organisms (plants and animals) acting on geologic material through time, under conditions modified by local relief and topography (Jenny 1930). Soils vary with slope, depth, texture, color, structure, organic matter, rock content, and pH, as well as the nutrient status and capacity to hold water to support plant and animal life and land use. These same soil properties also affect watersheds, wildlife and vegetation, and land uses such as agriculture, roads, trails, and recreation.

Soils have many properties that fluctuate with the seasons. Biologic activity is slowed or stopped if the soil becomes too cold, too hot, too moist or too dry. Flushes of organic matter come when leaves fall or grasses die. The soil resource is not static as pH, soluble salts, amount of organic matter, carbon-nitrogen ratio, number of microorganisms, soil fauna, temperature and moisture all change with seasons.

The analysis area has over 1,000 different soil types in 6 of the 12 soil orders. These soils vary dramatically, often over very short distances, and respond differently to use and management. Major uses of these soils are for range land, forest land, agricultural production, watersheds and recreation.

Most, if not all, of the soil data needed for site analysis, interpretation and assessment as a result of this FEIS is available from agencies, such as Natural Resource Conservation Service (NRCS), FS and the BLM. Soil surveys are available on a county basis, commonly at a scale of 1:24,000.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Impacts to soils would vary according to a particular soil type, topsoil properties, season of use, amount and type vegetation, as well as microclimatic conditions. Soil compaction is a common problem derived from any weight bearing traffic on a soil under selected soil conditions. This weight includes people, animals, hail, and wheeled vehicles. The degree of disturbance and compaction varies by site and would correspond to the type of driver, vehicle, tire tread, tire width, weight, angle of force to the soil, and vegetative cover. Usually, compaction increases as tire size



Pioneered roads can result in loss of protective vegetation and exposure to the forces of erosion, Helena National Forest. Photo courtesy of Montana Wilderness Association

decreases, or vehicle weight increases, and forces such as turning, accelerating or braking are added. Soil compaction is greatest when soils are moist and least when they are wet or dry. Soil compaction is reduced or eliminated in light and some moderate compaction conditions, especially on loamy soils high in organic matter, by the effects of freeze and thaw cycles during the seasons.

Wind erosion would increase as protective vegetative cover is reduced below 50% and where the landscape is open enough to allow strong or gusting winds to detach soil particles.

Water erosion in the form of sheet and/or rill erosion would be most common on poorly designed and or maintained roads and trails during periods of high soil moisture, rainfall and/or melting snow. Sheet and/or rill erosion can quickly occur on sensitive soils with concentrated cross-country travel. This is common when roads and trails on sensitive soils lose protective vegetation and become exposed to the forces of erosion.

Sheet and rill erosion would be greatest on erosive soils such as those forming from acid shales, clay shales or silt stones. Shallow soils on steep southern and/or western aspects are also sensitive to erosion. Soils least susceptible to erosion are forested and heavily vegetated grassland soils. Soils on glacial till landscapes with nearly level slopes protected by dense sod-forming vegetation would have little, if any, soil compaction or erosion from wind or water.

The surface horizon or topsoil is the lifeblood of a soil. It has the most humus, nutrients, seed source, structure and microorganisms needed by a productive plant community to stabilize the site. Loss of topsoil by accelerated erosion, or compaction, makes even the best soil more difficult to

stabilize or rehabilitate. Plant roots improve soil structure, increase water infiltration, and help anchor the soil and hold it in place. A diverse vegetative cover offers the best protection of the soil surface against accelerated water erosion.

No Action Alternative

This alternative, if OHV numbers and use increase as in the past, has the greatest potential impact to the soil resource. Areas currently open would allow for increased use of roads and trails as well as dispersed use of vehicles. This dispersed use could cause a small increase in soil erosion on roads and trails. Any increase in motorized wheeled cross-country travel, especially in a concentrated manner, has the potential to damage sensitive upland and riparian soils.

Alternative 1

In this alternative accelerated erosion would be limited to roads and trails. Impacts to the soil resource as a whole would be minimal as well as widely dispersed.

Alternative 2

Direct and indirect effects to soils and vegetation would be very similar to Alternative 1. Allowing for camping and limited cross-country travel would slightly increase impacts to the soil resource. The impacts to the soil resource are estimated to be less than 1% of the watershed or land resource area.

Alternative 3

OHV travel impacts from administrative or permitted use, big game retrieval or seasonal use are limited and would not occur often enough in the same route to remove sufficient vegetation to accelerate soil erosion. Any impacts to soils from these changes would be minimal and are estimated to occur on less than 1% of a watershed or land resource area. Overall, accelerated soil erosion from motorized wheeled cross-country travel would be reduced under this alternative except if motorized wheeled cross-country travel were to occur in a concentrated manner.

Alternative 4

The change in time periods available for OHV use would reduce soil erosion by reducing and shifting cross-country OHV use to periods when soils are likely to be dry or frozen.

Alternative 5

The impacts would be the same as Alternative 2.

Cumulative Effects

OHV impacts to soils would vary by the soil types, climate, type and amount of vehicle use. Direct short-term OHV impacts to the soil during moist or wet periods would alter soil structure and porosity. This would affect permeability, infiltration rates, soil/air and soil/water relationships and bulk density. Long-term impacts would reduce the organic matter content and reduce nutrient cycling in most high use areas. In the long term, while small areas of concentrated use would have significant impacts, overall there would be no significant loss of soil due to the very small amount of landscape impacted by OHV's.

AIR QUALITY

AFFECTED ENVIRONMENT

Air quality in the analysis area is excellent and due to remoteness, low population/vehicle levels and a general lack of industry, air quality is likely to remain high. Generally, ambient pollutant levels are well below measurable limits except at or near populated areas. Public lands in Montana, North Dakota and South Dakota within the analysis area are designated as having Class II air quality (good). Class I air quality areas in the FEIS area are limited to designated Wilderness Areas, Wilderness Study Areas, Indian Reservations, Glacier National Park and two National Wildlife refuges. Several populated areas such as Billings, Bozeman, Missoula, and Kalispell are designated as nonattainment Class II areas. No areas are designated Class III.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

OHV recreational use normally occurs during June to November in the analysis area. This time period is when climate, soils, and vegetation are usually at their driest. Fugitive dust levels would be temporarily and slightly increased by normal OHV travel in most of the analysis area during this time period. Fugitive dust levels would be lowest or not occur at all during November 15 to June 15. During this time most soil surface horizons are frozen, covered with snow or moist (Caprio and Nielsen 1992).

Areas most susceptible to slight, temporary increases in fugitive dust have soils with high levels of silt and/or carbonates in their surface horizons. These soil areas dominate eastern and central Montana. Areas least susceptible to increases in fugitive dust are those having soils with high levels of sand or clay in their surface horizons. These soil

areas are located in granitic areas of western Montana or the sedimentary clay shale areas of eastern Montana. Maps of these areas are available from existing soil surveys.

Motorized vehicle emissions cause a very small short-term impact to localized air quality. The amount and type of emissions will vary by the number of motors, type(s) of motor, motor size, and its burning efficiency. Motor emissions, like dust, are normally quickly dispersed by thermal drafts and winds. OHV emission pollutant levels can be concentrated, usually during winter months, in localized areas that have frequent thermal inversions.

No Action Alternative

This alternative has the greatest potential to influence and degrade air quality in the immediate area. The current amount of OHV travel on available FS and BLM public roads and trails is unknown. Any actual increases in OHV travel on existing or new roads and trails would have a corresponding increase in motor emissions and fugitive dust in the immediate area.

Alternatives 1 and 2

These alternatives prohibit motorized wheeled cross-country travel. In this scenario only a substantial and constant increase in OHV traffic on roads and trails would cause a measurable effect outside of the immediate area. Any increase in air pollutant levels are expected to correspond to those experienced on nearby unsurfaced federal, county and rural subdivision roads. OHV impacts from administrative travel, big game retrieval, or permitted use are very minor and would not occur often enough in the same place to remove sufficient vegetation to expose soil surfaces as a source of fugitive dust.

Alternative 3

This alternative has the same effect as Alternative 2 for those areas where OHV's are restricted. In the other areas, this alternative has the same effect as the No Action Alternative.

Alternative 4

Impacts to air quality are similar to the No Action Alternative. The time period for open travel is reduced with a reduction in potential fugitive dust and emissions.

Alternative 5

The impacts would be the same as Alternative 2.

Cumulative Effects

OHV impacts to air would vary by area, time of year, and amount of use. Most short-term impacts would be in areas having graveled or nongraveled county or public land access roads. Increases in fugitive dust and gaseous pollutants would be insignificant, except in the immediate vicinity of concentrated use. In the long-term, there would be no significant degradation of air quality due to the very small amount of impact from OHV's.

MINERALS

AFFECTED ENVIRONMENT

Energy mineral resources in the analysis area include oil and gas, geothermal (hot water/steam), oil shale, and coal. Nonenergy mineral resources (locatable) include precious and base metals such as gold, silver, copper, lead, zinc, and gemstones such as sapphires. Other mineral commodities which may be locatable include uncommon varieties of bentonite, building stone, limestone and gypsum. Saleable mineral materials include sand, gravel, landscaping rock, and building stone.

ENVIRONMENTAL CONSEQUENCES

Effects Common to All Alternatives

Overall, OHV restrictions would not limit vehicular access for mineral exploration and/or development conducted according to the terms of an approved permit, notice, plan, lease, contract, or other authorization. Mineral interests are entitled to reasonable access and use of the surface under the appropriate mineral development regulations unless specifically limited by the terms of their lease, permit or plan.

Geophysical operators are required to file and receive approval for a Notice of Intent to Conduct Oil and Gas Exploration Operations with the BLM or a Prospecting Permit with the FS prior to commencing operations on public lands. The operator must comply with the terms and conditions of the notice or stipulations in the permit, including any specific travel restrictions.

Surveying and staking of drilling operations may be done without advance approval from the authorized officer (On-shore Oil and Gas Order No. 1). Lessees and operators are strongly encouraged to notify the appropriate surface management agency prior to entry upon the lands for the purposes of surveying and staking. Early notification allows the surface management agency to apprise the lessees

and operators of any existing conditions, including vehicle access restrictions.

On BLM lands, no notification or approval by the authorized officer is required for casual use operations for locatable minerals. However, any person operating a motorized wheeled vehicle on those areas designated as limited or restricted must conform to all terms and conditions of the applicable designation orders. Use of motorized wheeled vehicles cross-country for casual use operations in areas limited or restricted would require permission by the authorized officer.

On national forests and grasslands, no notification or approval by the authorized officer is required for locatable mineral operations which will be limited to the use of vehicles on existing public roads or roads used and maintained for national forest/grassland purposes and that are open to the public. However, any operator proposing to use a motorized wheeled vehicle in national forest and grassland areas designated as limited or restricted must file a notice of intent or plan of operations and receive approval from the authorized officer prior to proceeding.

Completed notices and/or approved plans of operation are required before ground disturbing activities for locatable minerals can occur. Prospecting permits, leases, or contracts must be submitted and approved before ground disturbing exploration for or development of hardrock leasable minerals or saleable minerals. Applications for Permit to Drill and, possibly, special use permits must be submitted and approved before oil and gas drilling operations can commence.

Notices, plans of operation, permits, etc. properly filed and approved, would constitute authorization for motorized wheeled cross-country travel as specified in the notice, permit or approved plan. The operator must comply with the terms and conditions of the authorization, including any specific travel restrictions.

No Action Alternative

Under the No Action Alternative, there would be no impact to mineral exploration or development.

Alternative 1

In those areas available for mineral exploration and development, use of motorized wheeled vehicles by operators, contractors, surveyors and others for cross-country travel for such purposes as prospecting, exploration, locating lines, locating potential access routes, and staking drilling locations would require prior approval from the authorized officer. Currently, OHV's are used in many areas for

surveying and staking of mining claims and proposed drilling operations without advance approval from the authorized officer. This alternative would increase the amount of administrative approval required before some routine activities could occur.

The increased administrative review could increase the time required before operators can initiate activities on the ground. These timing delays, and the associated administrative burden of obtaining approval or permits, could negatively impact mineral project schedules and economics. As the mineral operators adjust their future project plans and scheduling to account for these requirements, the impact would be minimal.

Alternative 2

There would be no impact to existing holders of mineral leases or permits. Operations could occur according to the terms of the lease or permit.

Currently in areas open to motorized wheeled cross-country travel, pre-permit surveying and staking of mining claims may be done without advance approval from the authorized officer. Under this alternative, operators without a lease or permit would have to notify the appropriate surface management agency prior to entry upon the lands for purposes of surveying and staking if they wished to use vehicles cross-country. This would increase the amount of administrative approval required as discussed under Alternative 1.

Alternative 3

The impact would be similar to Alternative 2, except there would be no impact to mineral resources in the portion of the analysis area that would remain open to motorized wheeled cross-country travel (Flathead, Kootenai, and Bitterroot National Forests).

Alternative 4

The impact would be similar to Alternative 2, except motorized wheeled cross-country travel would be allowed from December 2 to February 15 and from June 15 to August 31.

Alternative 5

The impact would be the same as Alternative 2.

Cumulative Effects

The No Action Alternative would have no cumulative effects to mineral resources. Alternative 1 would increase

the time required before operators can initiate activities on the ground but in the long term this impact would be minimal. Alternatives 2, 3, 4, and 5 would increase the time required before casual use operations could be initiated on the ground.

UNAVOIDABLE ADVERSE IMPACTS

This section summarizes the unavoidable adverse impacts. Only those resources with adverse impacts are discussed.

Visuals and Recreation

The No Action Alternative has the most detrimental effects to recreation experiences by contributing to conflicts between users. Since Alternative 4 leaves the summer season open to motorized wheeled cross-country travel, it has the next most detrimental effects to recreation experiences. Motorized users under Alternatives 1, 2, and 5 may feel they are losing some opportunities for their recreation activity.

Vegetation and Weeds

Under the No Action Alternative, motorized wheeled cross-country travel has the potential to eliminate or seriously affect populations of the western prairie fringed orchid on the Sheyenne National Grassland in eastern North Dakota. Under Alternative 4, motorized wheeled cross-country travel would be allowed during the summer months, which coincides with the flowering period for this species. The No Action Alternative and Alternative 4 May Affect, and are likely to adversely affect the western prairie fringed orchid.

SHORT-TERM USE/LONG-TERM PRODUCTIVITY

This section identifies the trade-offs between short-term use and long-term productivity of the resources involved in the alternatives. Only those resources affected are discussed.

Visuals and Recreation

Under the No Action Alternative, the continuation of user-created roads and trails could lead to more roads and trails that may need to be reclaimed when site-specific planning is completed. Since there would be the potential for more roads and trails, it would take longer to reclaim the roads and trails not needed for a permanent public land transportation system. Creation of more user-created roads and

trails is possible under Alternative 4, but most likely there would be fewer new roads and trails than under the No Action Alternative.

Vegetation and Weeds

The invasion of native plant communities by weeds can lead to short-term losses in use of habitat by wildlife, recreationists, and livestock permittees, reductions in biodiversity, loss of threatened or endangered and sensitive plant habitat, and loss of topsoil through increased rates of erosion, which often leads to increased sedimentation in streams and lakes. These effects on short-term use can turn into long-term productivity losses.

IRREVERSIBLE OR IRRETRIEVABLE RESOURCE COMMITMENTS

This section identifies the extent to which the alternatives would irreversibly limit potential uses of the land and resources or irretrievably use, consume, destroy or degrade those resources. Only those resources with irreversible or irretrievable resource commitments are discussed.

Vegetation and Weeds

The invasion of native plant communities by weeds is an irretrievable commitment of resources once they are beyond the initial eradication stage. The invasion of native plant communities by weeds can lead to losses in use of habitat by wildlife, recreationists, and livestock permittees, reductions in biodiversity, loss of threatened or endangered and sensitive plant habitat, and loss of topsoil through increased rates of erosion. After the initial eradication stage the effort is to try and minimize their impacts on all resources and minimize their spread to uninfested areas. It means an ongoing effort into the foreseeable future, of expenditures in cooperative Integrated Pest Management efforts.